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Volume 7, Number 12
December 1984

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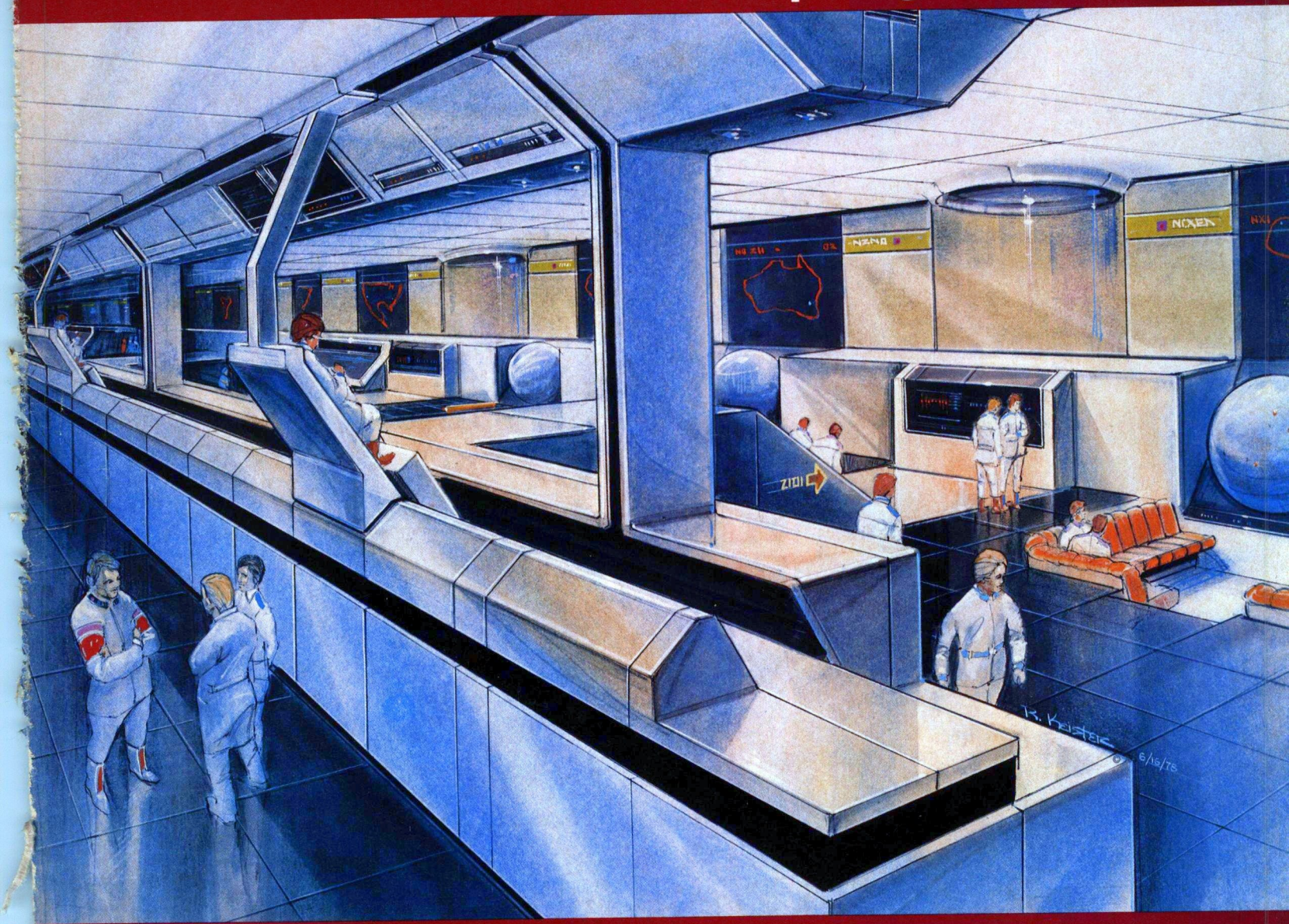

- Computer Haves and Have-nots
- Smartmodem Operator
- Spreadsheet of the Future
- Graphics Toolkit — Part 4
- The //c vs. the //e
- Poor Man's Superfast Ramdisk

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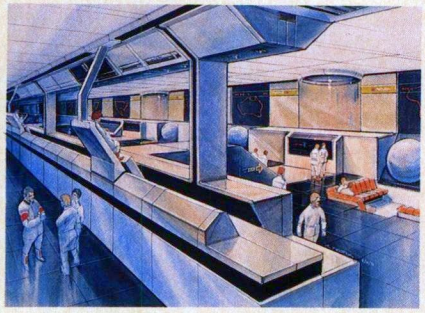

About the Cover

Artist Ron Keister depicts here an image of the electronic environment in a world of the future. We are grateful to Ron for making so many of our 1984 covers both colorful and provocative, and we look forward to his contributions in the year ahead.

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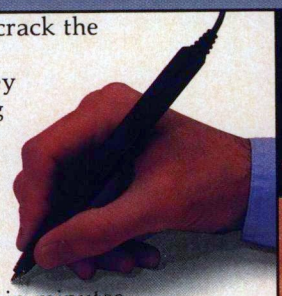

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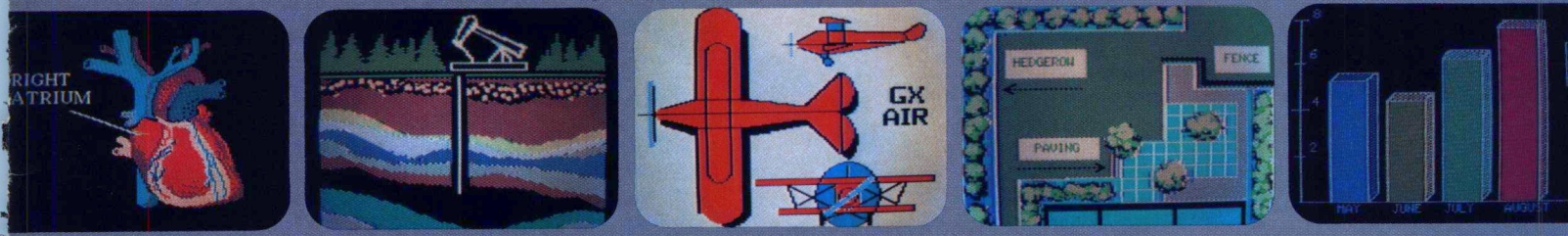

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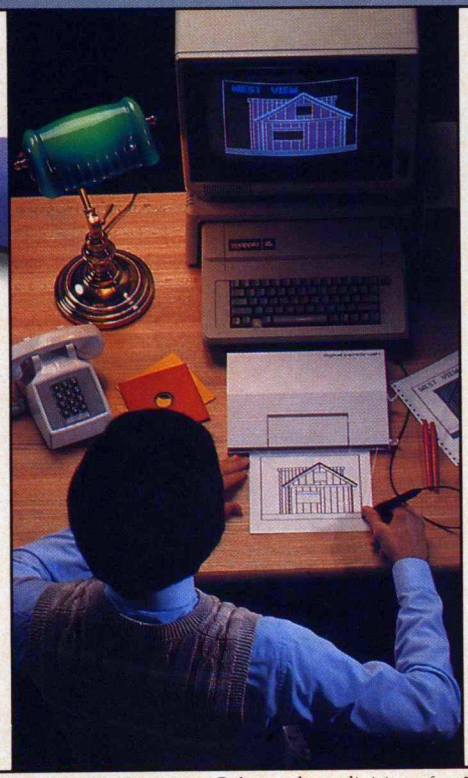

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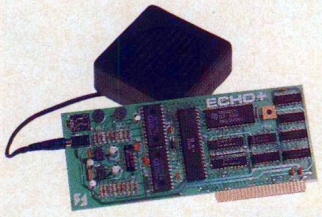

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Two Steps Forward?

The end of a year is usually a time for looking in two directions at once—back at what has been accomplished, and ahead at the challenges and opportunities still to come. Progress in the computer industry—as in most other areas—has not followed a smoothly accelerating growth curve, but instead has exhibited peaks and valleys which can have wide-ranging effects.

For Apple Computer, of course, two of the high points in 1984 were the introduction of the Macintosh in January, followed by the *//c* in April. Despite Mac's relatively high price and the excruciatingly slow appearance of good commercial software, it has proven to be one of the most refreshing personal computer systems in years. While frustrating many "under-the-hood" computerphiles, its unique human interface has made computing power accessible to large numbers of people who prefer not having to memorize and type cryptic commands or abstract control codes. At a time when interest in most user groups is leveling off, Mac groups are sprouting up around the country with a degree of enthusiasm that has rarely been seen this decade.

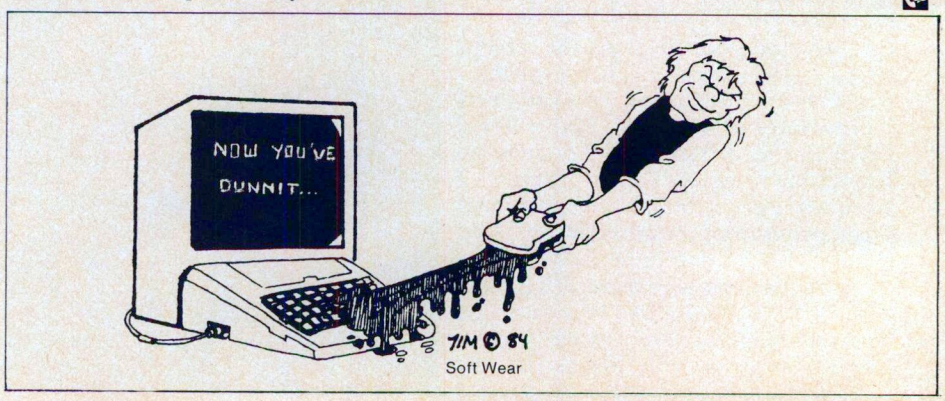
Although the *//c* will most likely turn out to be a profit maker, it has apparently fallen short of an unequivocal success so far. Did Apple Computer cut its own throat by slashing *//e* prices when offering the *//c* at a hefty $1295? At the very least, the company seemed to underestimate the cost-consciousness of today's home computer buyers, which IBM is now exploiting with the PCjr. We're still convinced that the *//c* will find a significant niche to fill—even if it's under the "blue light special" at your local discount store.

In This Issue

Our end-of-year speculation on the future of microcomputers is tempered with an emphasis on more immediate needs. Jonathan V. Post leads off with a vision of societal impact that may not please everyone in **Computer Haves and Have-nots**. Next, our spreadsheet expert, Jeffrey M. Jacques, presents a holiday wish list of spreadsheet features he would like to see in future versions. In **The *//* c versus the *//* e**, Cecil Fretwell and Gary Little compare technical features of these two computer cousins, so you can decide for yourself which one is more likely to survive.

Later in the issue you'll find some articles that should be useful both today and tomorrow. Randi J. Rost returns with part 4 of the popular **Graphics Toolkit**. Steven Meuse gives us a program entitled **Poor-man's Superfast Ramdisk**, which may become one of the most useful utilities in your library. **Smartmodem Operator** by Ken Kashmarek can help automate your telecommunication system. Rounding out the pages is our regular smorgasboard of columns, letters, and departments.

Finally, we thank all of you who have taken the time to provide feedback about **Call -A.P.P.L.E.** this year. Though we haven't been able to publish or acknowledge every letter, be assured that your input has registered, your data is on file, and the program's flow will follow—as far as possible—your commands.



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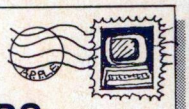

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SURVEY

What one computer do you currently use most?

A ☐ *Apple II*
B ☐ *None*
C ☐ *Apple IIe*
D ☐ *Other (specify)*

What hardware product are you most likely to buy in the next 4 months?

E ☐ *Hard Disk*
F ☐ *5 megabyte*
G ☐ *10 megabyte*
H ☐ *20 megabyte*
I ☐ *8086 board for your Apple (run IBM P/C software)*
J ☐ *Apple keyboard (increase capability)*

What computer language would you likely purchase in the near future?

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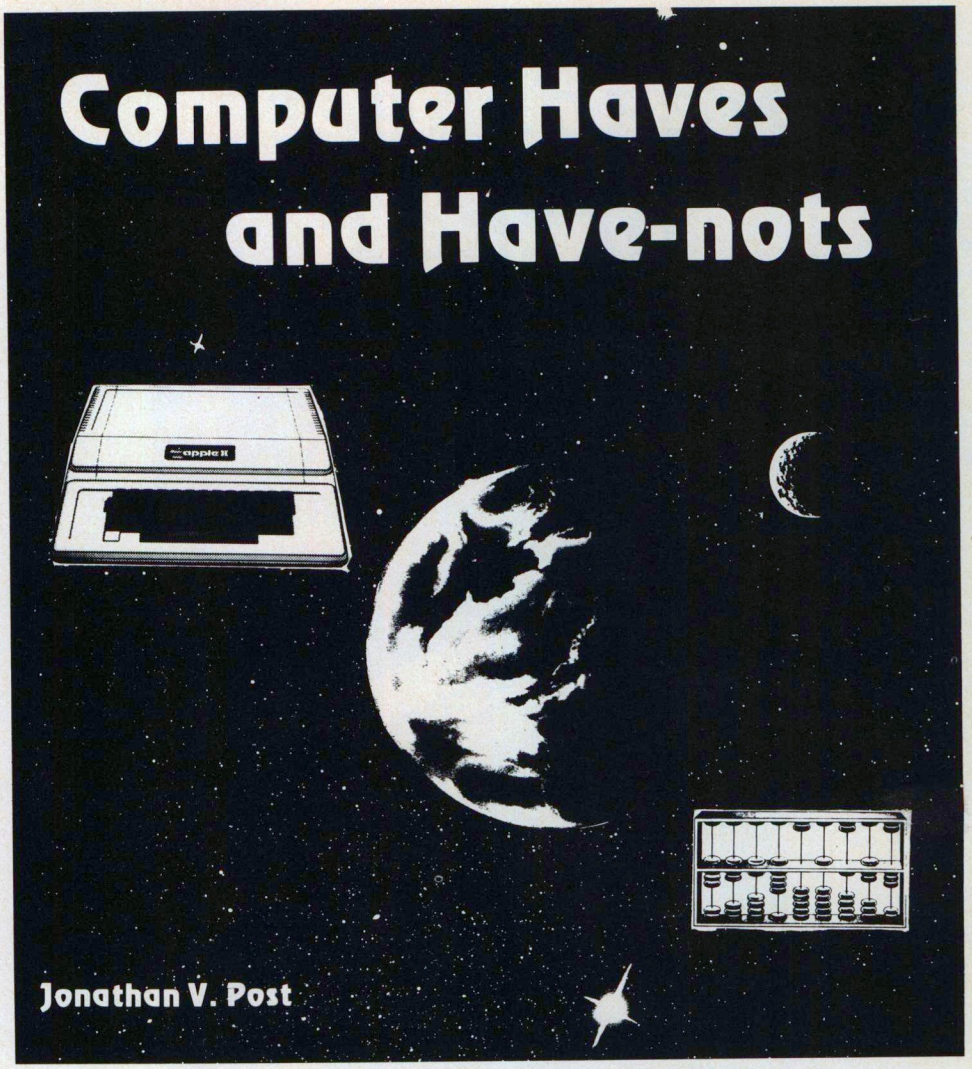
Computer Haves and Have-nots



PORTIA ISAACSON (*The Next Ghetto: The Information Poor*) predicted in 1978 that computers might "drive a wedge between two segments of our society." As the automobile unexpectedly allowed the diaspora to the suburbs and stranded the ghetto poor in the inner city, so also "the personally affordable computer will separate the information rich from the information poor".

It will be important for social equilibrium to make sure that portable personal computers permeate the inner-city. Otherwise, Portia Isaacson's vision that "the next ghetto will be those who cannot afford or will not use today's marvelous new invention, the personal computer" will be reality.

There are two other important considerations to the theory of the ghetto of computer have-nots. Computers may increase the social effects of sex differences, and dump a disproportionate percentage of women in the compu-ghetto. And computers can either improve the technological development of the underdeveloped majority, or create a new global ghetto of third-world poor trapped on the wrong side of a silicon curtain.

Computers and Sex

Psychologists Irene Miuro and Robert D. Hess of Stanford reported to the 1983 annual meeting of the American Psychological Association that schoolgirls are at an extreme disadvantage. Almost all five- to eight-year-old owners of home computers are boys. By junior high school, the boys still out-possess the girls by two-to-one. In the typical family with a computer, a disturbing stereotype is being followed. Dad does business computing, boys spend two to three hours a day programming and playing games on the computer. The mother and the daughter rarely, if ever, touch it. (*Computing Sex Differences, Wray Herbert, Science News, 17 Sep 83, p.187*)

Parents are more aggressive in sending boys to computer camps. Among 5000 compucampers, 73% of beginning and intermediate enrollees are boys. By the time the most advanced computer camp classes are reached, boys make up a near-monopoly of 95%.

Software is not perceived as gender-neutral. Children and adults both classified a third of 75 software titles as of special interest to boys. Miuro and Hess found that only 5% of software titles were viewed as interesting to girls.

Developing Developers

The global geo-politics of the computer revolution are being met head-on in India. The Computer Society of India, backed by a 1982 software export policy of the government, intends to prove that the third world need not be locked out of the software future by attempting to meet the needs of Western countries. (*New Scientist, 21 April 83, p. 137*)

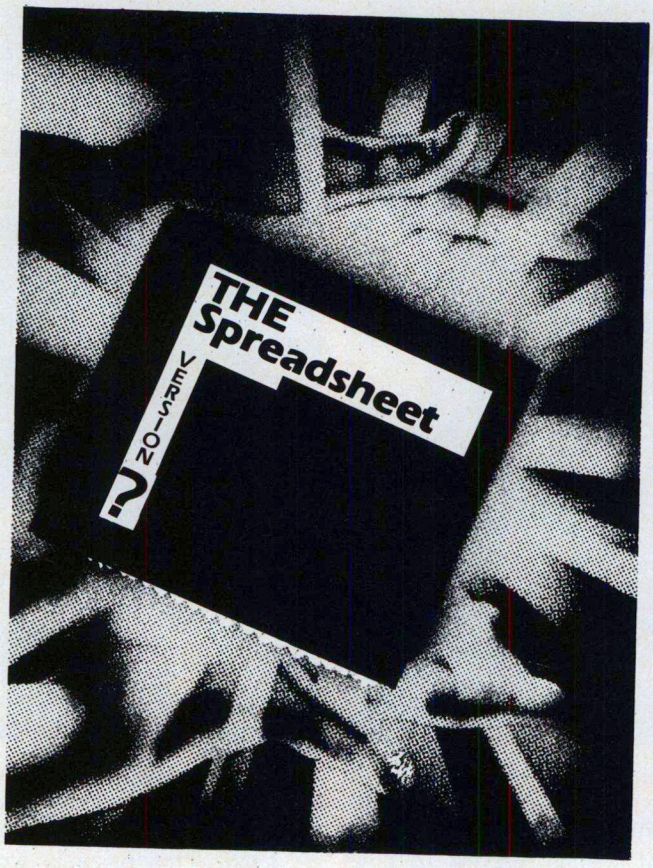
The U.S. currently faces a shortage of skilled programmers. Already, in America, there are more personal computers than there are people who can program (as opposed to using pre-packaged programs). India intends to step up their own software training from 500 to 22,000 new programmers per year. By exploiting the western programmer shortage, India would capture up to 10% of the world computer software export market by 1986. This prize is worth a billion dollars per year.

What are India's chances in the gigabuck gamble? Julian Bogod of the U.K. Council for Computing Development said the plan was "over ambitious to say the least".

Yet India did export $50 million of software in 1980. In India, the cost per graduated programming student is only $30,000 to $50,000, while costs are ten times as high in the United States. Perhaps cheap labor will dominate the third world's computer future.

Or perhaps the technology gap between haves and have-nots will continue to widen to the point of no return. If any race, sex, nationality, or creed is cut off from global computer resources, then we all fail. If all human beings are given computer rights as part of our human rights, then the computer future will be our common heritage.

Spreadsheet of the Future



Jeffrey M. Jacques

WHAT would we like to see in the next generation of spreadsheets? Let's develop a wish list for those who use *THE Spreadsheet* as well as those who create spreadsheet software. While my comments reflect the assets and limitations of *THE Spreadsheet*, our wish list for spreadsheet enhancements will apply to most spreadsheet software.

Printing Enhancements

The PRINT IN SAVE FORMAT option *always* prints the entire table. Often, I only need a few of the formulae from a few cells rather than the entire table. By entering beginning and ending coordinates, I would like to be able to limit the output to those cells in which I have an interest.

Often one sends a file to the printer which turns out to be slightly too large to fit on one standard 8 ½ by 11 inch page. Since THE Spreadsheet does not indicate the number of columns required for successful printing, the same page must be reprinted in condensed format, wasting considerable time, effort, and paper. Perhaps in the PRINT SUBSYSTEM an additional line of information might list the number of columns required. After all, we have the STARTING CELL and ENDING CELL coordinates listed in rows A and B, respectively. Now, why couldn't we have row F list the required number of columns used by the worksheet?

Editing Enhancements

While the editing features of MagiCalc follow in the tradition of VisiCalc, VisiCalc does not have a strong edit facility. You are either limited to replacing the value or label of an entire cell, or you can use the arrow keys to place the cursor one character beyond that which you intend to delete with the ESC key. This is not very fast or particularly efficient.

We would like to see the ability to identify a rectangular set of cell coordinates which would invoke a simple editor. (Even a line editor would be an improvement.) For example, if the body of a table were stored in cell columns A through E and rows 5 through 25, then it would be nice to be able to use rows 1 through 4—cells A1 through E4—as a header for the table and rows 26 through 35—cells A26 through E35—as a footnote section. In both cases, rows 1 through 4 and rows 26 through 35 could be defined for text only, and then columns and cell coordinates would not matter. A simple line editor would be accessible whenever the marker was placed within this section of the worksheet. In this way, a title could be centered across the width of the table and a simple summary of text could be developed easily, edited efficiently, and modified speedily without having to suffer columnar and cell coordinate limitations.

Calculate Subsystem Enhancements

In the CALCULATE SUBSYSTEM, several features are missing from THE Spreadsheet. First, a sorting routine is needed. Even if it were a simple bubble sort routine, limited to sorting on a single row or column at a time, it would be a considerable improvement. (A simple bubble sort, written in assembly code, works quickly with a limited number of elements and re-arranging a row or column of values.) Since each sort would move an entire row or column of values, several sorts could be run successively if you needed to structure your worksheet sorted on several variables.

The IF-THEN structure might be improved in several ways. First, labels should be an available option. At the very least, I should be able to insert a blank in a cell when I use an

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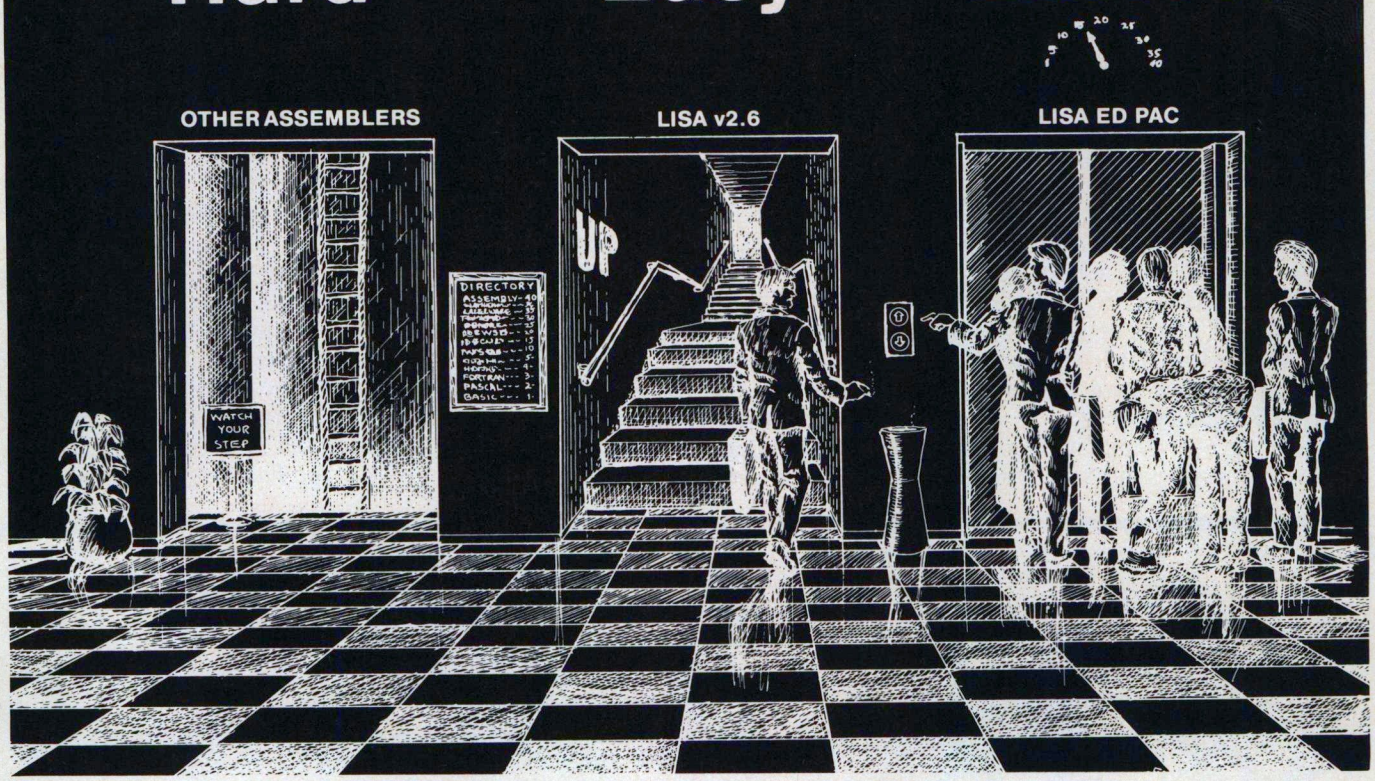

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Circle 14 on Reader Service Card

appropriately constructed @IF statement. Second, I would like an opportunity to use several functions along with the @IF statement. See September's issue for a discussion of these options.

People who use THE Spreadsheet for maintaining class rosters would like the option of entering a student's name on multiple lines within the same cell coordinate. While the first line of the cell would be displayed in the worksheet, the first, second, and even the third line would be printed on the hard copy. Having additional lines within a cell would not change the row cell numbers nor necessitate any modification of the formula using cell references, but would just be a slightly different way to handle labels.

The ability to link worksheets, as in MultiPlan, can make it easier to maintain better control over individual small applications, and to compute overall summaries in an efficient manner. This might be a nice option for those who have large and complex needs and do not wish to purchase additional memory cards.

Have you ever found, in the middle of entering a worksheet or formula, that you needed an intermediate value such as 123245656 / 876543 * some-other-value? Some people keep calculators next to their Apple just for this type of situation. It would be nice to have a keystroke that would invoke a calculator option. The information box area might display the results while the option was in effect. Upon exiting the calculator option, normal information box display would be returned and you would be placed back in the middle of your formula with the result from your calculator activities. Such a scratch pad would save the time of leaving a formula half finished, going to a different cell to make the intermediate computation, returning to the original cell, entering the edit facility, and completing the form.

Finally, and most importantly (at least for me), I would like to have access to at least a modified version of BASIC in THE Spreadsheet. I would love to have the option of inserting a simple FOR-NEXT loop. For example, to compute the variance of a column of numbers—stored in column A, rows 1 through 20, and the @AVERAGE stored in cell A21, I would like to have the opportunity to store the following expression in cell A22:

```
FOR ROW = @ROW1 TO @ROW20
  : A22 = A22 + ((A(ROW) - A21)^2)
    : NEXT ROW
      : A22/20
```

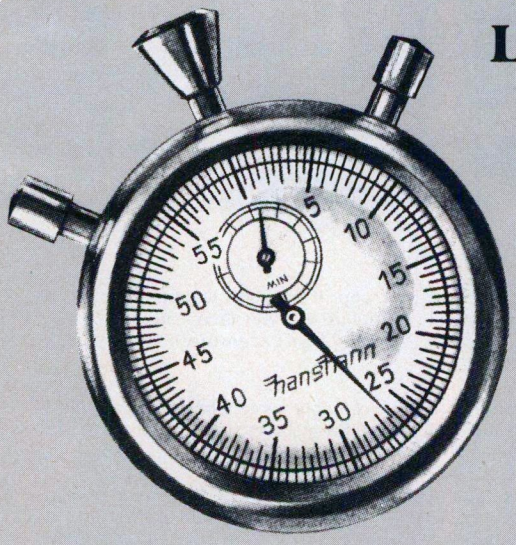
Of course, all BASIC expression should be considered valid and be accessible from THE Spreadsheet.

While the new advanced version of VisiCalc has implemented the DOT-PRODuct command to handle some of these problems, direct access to BASIC would be preferable. Missing data, for example, could be handled easily with the FOR-NEXT loop modified with an @IF expression such as:

```
@ IF(A(ROW) =0,A22,A22 =
  A22 + ((A(ROW) - A21)^2)
```

Well, this is our holiday wish list. Perhaps it will help the creators of the next generation of spreadsheet software. Let me know what you would like to see included. While we might not get everything, a few improvements would be greatly appreciated.

Are you listening Bill Graves?



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The //c vs. //e (Part 1)

Cecil Fretwell and Gary Little

TO KEEP the Apple II family in pace with rapidly advancing technology, Apple Computer has introduced the "Apple //c." In this article, we will take a look at what has been done to "upgrade" the //e to the //c.

Before we talk about the //c's computing capabilities, we need to praise the 9" monitor from Apple. It can sit on a stand that allows it to hover neatly over the main keyboard unit. The monitor is amazingly sharp in its character display; indeed, 80-column mode on the //c is noticeably sharper than 80-column mode on the Monitor ///.

What's Unique About the //c?

The most impressive feature of the //c is its size. The entire system, without a printer, is about 11" wide, 15" deep, and 13" high. Without the printer, the system with monitor weighs less than 20 pounds. This makes the system highly portable for things like carrying the system from home to office or on business trips. All we need now is a highly portable printer.

The //c is a "complete" computer. Although it cannot be expanded by adding cards as can the //e and earlier models, this is not a serious restriction for most users. In addition to a 140K built in disk drive, the system comes with a serial printer port, a serial modem port, a video monitor port, a game/mouse port, and a port for a second disk drive. If one does not purchase a monitor, an RF modulator is included, at no extra cost, to attach the //c to an ordinary TV set. About the only fault we find with the hardware is that it does not include clock circuitry to support the date- and time-stamping feature of ProDOS. Never fear because we have a solution to this in the form of a clock program that we will describe in a follow-up article.

The Keyboard

The //c's keyboard remains almost the same as the //e's with regard to the location of keys. The width of the keyboard from the CONTROL key to the RETURN key is still 11". About the only objection is the "softness" of the keys. For those of us used to "pounding" on the old II, it is easy to get double characters, especially when resetting one's fingers on the "home" row.

The RESET key has been moved to the left hand side, which makes //e users really think about what is required to reset the system or reboot it with CONTROL—OPEN APPLE—RESET. The power light has been moved to the upper right hand corner of the keyboard and is accompanied by a disk use light.

Two switches have been added to the top of the keyboard next to the RESET key. One is labeled "80/40" and has no effect on the monitor firmware. It can be examined via software and when locked in the down position indicates that only 40-column mode is allowed for the system.

The second switch is labeled "KEYBOARD." When in the up position, the keyboard operates in the so-called QWERTY mode (sometimes known as the Sholes keyboard). When this switch is down, the keyboard operates as a Dvorak keyboard; this means, for example, that the ASDFG keys now become AOEUI. You can play a cruel joke on a naive user (such as one's wife) by locking this switch down!

Internal Hardware

The //c uses the NCR 65C02 processor, which supports 27 instructions more than the standard 6502. The more technically minded will find that the 65C02 used in the //c is not the same 65C02 described in the Rockwell spec sheets. The Rockwell version supports many more op codes. The 65C02 also fixes the JMP ($3FF) type of problem. The 6502 incorrectly uses $3FF and $300 to form the effective address; the 65C02 uses $3FF and $400, as would normally be expected.

No increase in speed is realized when going from the //e to the //c. In general, one will find that programs written on the //e will work on the //c, i.e., programs are upward compatible. On the other hand, not all //c programs, especially assembly language programs, will work on the //e. For example, the //c system utilities will not work on the //e because they make use of the new 65C02 instructions. Physically transporting disks from the //e to the //c and vice versa present no problems.

The //c comes with 128K of memory (64K of main memory plus 64K of auxiliary memory). In other words, there is no need to purchase an extended 80-column text card if one wants that memory capacity. Since the system is shipped with ProDOS, all //c users have the /RAM "memory disk" volume available.

Software

The //c system is shipped with several diskettes. The one called SYSTEM UTILITIES contains ProDOS, BASIC.SYSTEM, and utilities for formatting disks, copying disks, etc. For those familiar with ProDOS on the //e, FILER and CONVERT are embedded in these utilities. Our //c systems came with ProDOS 1.0.2. ProDOS 1.1 became available to developers around September 1, 1984 and will probably be shipped on future //c systems. There are rumors that even this version will soon be changed.

DOS 3.3 users who would rather fight than switch can relax. The //c is just another dumb computer and doesn't care what operating system is booted. If you want to take a chance with your Applewriter //e DOS 3.3 based disk, the June 1984 issue of *Apple Assembly Line* shows you how to "zap" your disk to make it work almost perfectly on the //c.

The other disks include "An Introduction" whose main purpose is to introduce the //c to a beginning user or bring a more experienced user up to speed on the system. The "The Apple at Play" disk provides some games and even a program to compute an amortization schedule. The "Exploring Apple Logo" disk introduces a user to the Logo graphic software available from Apple. The "The Inside Story" disk presents a very informative graphic tour of what the //c looks like on the inside. That is about all the look we get because opening the actual //c violates the warranty.

The "The Apple at Work" comes on both sides of a disk and introduces the user to word processing, "spreadsheets," and database management. It provides an excellent advertisement for AppleWorks. Finally, the "Getting Down to BASIC" disk introduces the user to the BASIC language. This combination of disks is an outstanding way to make one comfortable with the //c.

Firmware

For those of you who like to poke around with the internals of a system, you will find a lot of differences between the F8 ROM on the //e and the F8 ROM on the //c. Furthermore, the $C000 bank is totally new; it contains the code that supports all of the //c's built in I/O ports. Even the Applesoft code in $D000 to $F7FF shows quite a few changes. For example, all of the code for the cassette tape commands has been deleted to make room for new code that supports special //c features. About all we can say here is that if one sticks to standard entry points such as CLREOP (CALL -958 or JSR $FC42) to clear to end of screen, CALL -151 to get to the monitor, etc. almost all earlier II programs will work on the //c.

Now let's explore some more of the things we like about the //c. The flashing checkerboard cursor still indicates that the text card is not active. However, if one presses the ESC key to enter ESCape mode, the checkerboard cursor becomes a non-flashing "+" on the screen. This doesn't happen on the //e unless the 80-column firmware is on.

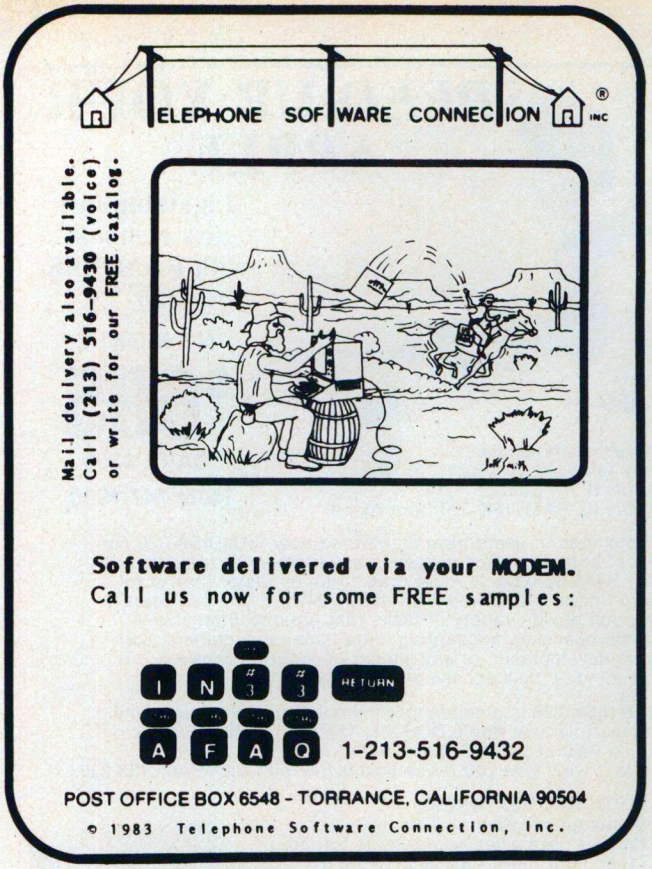
An excellent change was made to facilitate editing an APPLESOFT program by moving the cursor around for editing purposes while in ESCape mode. When a line or lines are listed, a blank is always placed in front of the line number. The result is that when editing several lines in sequence, the prompt character now replaces the space instead of the first digit in the line number.

Cecil's article in the August 1984 issue of *Call -A.P.P.L.E.* revealed several quirks in using the 80-column firmware on the //e. These quirks appear to be absent from the //c's firmware. PRINT 1,2,3,4 now behaves itself. In all modes, HTAB and VTAB work properly on the //c without having to fiddle with POKE 1403. One can even POKE 36 to position the cursor within a line. The GET A$ type of code now behaves itself in all modes and allows GETting things like the ESC key, left arrow key, etc.

Do not get angry if you cannot use FLASH when in 80 column mode. Again, it is a matter of not having enough room in the character generator ROMs to support everything. Assembly language programmers who like to fiddle with bits in a character to produce NORMAL, INVERSE, etc. will have a lot of fun playing around with the MouseText characters (80 column card only) which include some neat little symbols like a solid apple, an open apple, a file folder, and a running man.

The MouseText characters may cause some problems when transporting a //e program that uses 80-column mode to the //c. In assembly language programs that poke characters directly to the screen, the standard method of producing INVERSE characters is to set Bit 7 in the screen character or clear Bit 7 to produce NORMAL characters. Using this scheme on the //c will cause, for example, an INVERSE A to become the open apple symbol. At this point, we don't understand why Apple chose the range $40 to $5F for the MouseText characters when the range $00 to $1F is a more logical choice and avoids this problem.

If you are tired of activating 80-column mode using PR#3 on the //e, the //c saves you two key strokes. With the flashing checkerboard cursor active, ESC 8 places you in 80 column mode. ESC 4 still works the same way. To get back to the flashing checkerboard, you still have to use ESC CTRL-Q.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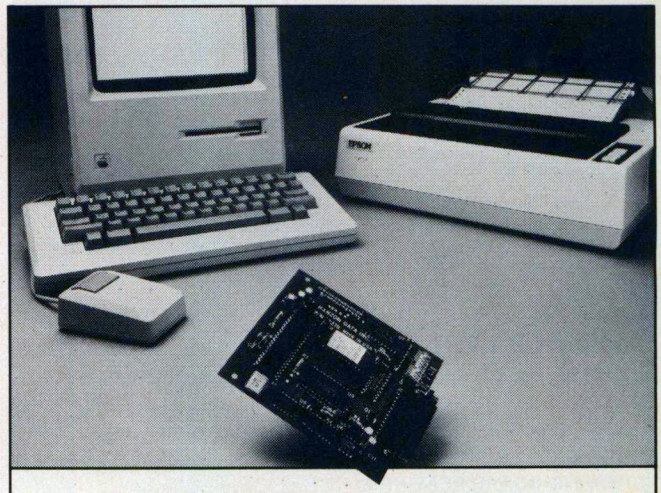

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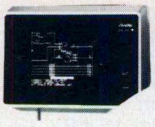

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Circle 21 on Reader Service Card

How many times have you used something like Applewriter with the CAPS LOCK key up, left that key up, and switched to say using ProDOS? Your LOAD command in lower case works fine but when you enter LIST in lower case you get the nasty bell and a message. CTRL-R in 80-column mode only on the *//e* solved this problem, the *//c* does the CTRL-R automatically for you. You can now enter APPLESOFT programs in lower case and the *//c* will change them to upper case for you, e.g., goto becomes GOTO when you LIST the program. It even preserves lower case inside quote marks used to PRINT a string.

There are a few of us that like a flashing cursor when the text card is active. On the *//e* this took special code from a program called MAGIC MENU (listed in the Apple manuals) or the code given in Cecil's article in the August 1984 issue of NIBBLE. Don't even bother trying Cecil's code on the *//c* because it doesn't work. Even if it did, it chews up memory. On the *//c*, a simple POKE 2043 lets you customize the cursor to your heart's desire. For example, POKE 2043,223 gives you a flashing underline cursor in all modes.

Gary has included all kinds of goodies in his forthcoming book, *Inside the Apple //c*, such as the POKE 2043 idea. Another feature he describes is the type-ahead capability of the *//c*. For example, one can enter the following trivial program:

```
100 FOR I = 1 TO 2000: NEXT
```

and then start typing madly away at the keyboard. When the program finishes, all the keystrokes that you entered should be displayed after the APPLESOFT prompt symbol. The short assembly program to do this is:

```
A9 01 LDA #$01
8D AA C0 STA $C0AA
A9 80 LDA #$80
8D FA 05 STA $5FA
58 CLI
60 RTS
```

It only needs to be executed once for type-ahead to be in effect. The type-ahead buffer is 256 bytes in length and starts at $800 in auxiliary memory. There are some "problems" with this when the disk is active because interrupts are temporarily disabled during this process.

In the next article, we'll present a neat piece of software that adds a clock to your *//c*.

A "Computer" Poll

Prior to last month's presidential election, *Call—A.P.P.L.E.* initiated an informal poll among patrons of computer product stores in the only two counties that had voted for every winning candidate this century—Crook County, Oregon and Palo Alto County, Iowa. In both counties, computer store customers picked Reagan, though by smaller margins in Iowa where agriculture has not enjoyed the recovery of much of the rest of the country.

In the actual election, the Oregon county confirmed the poll by voting 3,773 for Reagan and 2,268 for Mondale. However, Iowa's Palo Alto County—which had been in the winner's box since 1896—fell out this time, giving Mondale 3,018 to Reagan's 2,715.

So now there is one—just one—county in the nation which has preserved its record of always (since 1884) picking the winner in presidential elections. Whatever it is that permits Crook County's voters to accurately gauge the political tides, County Clerk Mrs. Grace Bannon observes, "We're the only ones. It's a secret and we won't tell."

Oh yes, besides the computer store clientele, there is an island of accurate foretelling in Palo Alto County. Silver Lake Township went for Reagan with 145 votes to 124 for Mondale.

Beagle Bros Apple® Software Report

Ad Number 182 — *"All the News That Fits"* — *Fall/Winter 1984*

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The nice thing is you *can* make your Apple do anything you can think of, with just a little help—Beagle Bros software helps make your Apple a more powerful machine, and *you* a better programmer.

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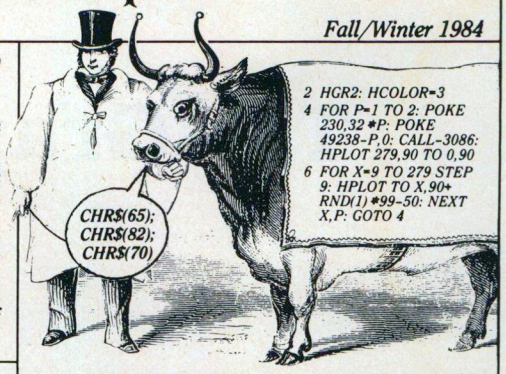
CHR$(65);
CHR$(82);
CHR$(70)
2 HGR2: HCOLOR=3
4 FOR P=1 TO 2: POKE 230,32+P: POKE 49238-P,0: CALL-3086: HPLOT 279,90 TO 0,90
6 FOR X=9 TO 279 STEP 9: HPLOT TO X,90+RND(1)*99-50: NEXT X,P: GOTO 4

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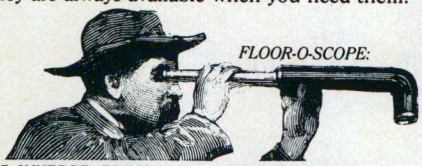


```
5 INVERSE: PRINT SPC(7): A=A+1-3*(A=3)
8 POKE 2053,A+156: B=B+1: IF B<143 THEN 5
```

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Rename Applesoft commands & error messages to anything. For clarification, encryption-protection or even foreign translation. For example:

```
10 POUR X=1 TO 3: ECRIVEZ "BONJOUR": ENSUITE
```

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```
A$="Dogfood"  ←VARIABLE-DISPLAY: prints
X=3.14159       all of a program's strings &
Y=255           variables with current values.

A$: 5 10 150  ←CROSS-REFERENCE: Sorts
X: 10 20 3000   & displays line numbers of
Y: 5 40 55 60   each variable & string.
```

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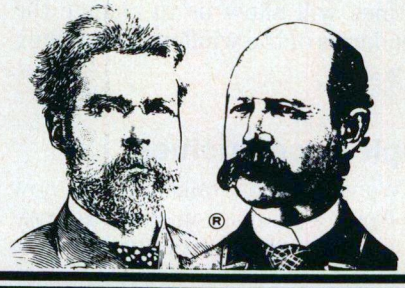

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The Graphics Toolkit — Part 4

Randi J. Rost

IN the past three installments of this series, we developed routines to perform the most common graphics functions. This time, we'll talk about establishing a "graphics window" and present a routine that will perform some interesting operations on the contents of that window.

Graphics Windows

The term "window" has about as many meanings with respect to computer graphics as there are graphics programmers. The definition we will use is as follows: a window is a subset (usually rectangular) of the entire graphics screen, outside of which graphics commands have no effect. In other words, a rectangular subset of the graphics screen can be established as a graphics window, and the area outside the window will become immune to all graphics operations. Only the area inside the window can be affected by commands that draw lines or shapes.

This brings us to the subject of clipping. Clipping a line or shape involves discarding any part of the line or shape that is outside a specified boundary. For instance, it is useful to clip lines that would otherwise extend beyond the Apple's screen boundary of (0,0) to (279,191). Oftentimes the line-drawing algorithm causes unclipped lines that extend beyond the screen boundaries to "wraparound" to the other side of the screen.

As an example, let's consider a graphics device with a resolution of 256 x 256. The current location can be stored in two bytes, one byte for the current x position and the other for the y position. Now let's imagine drawing a line from 150,150 to 300,200. The algorithm that will draw lines will probably just plot points and increment the x and y values whenever necessary. But what happens when the x value is 255? Incrementing 255 gives 0 and the line will "wraparound" to the left edge of the screen.

Applesoft clips lines by checking the endpoints that you provide. If either endpoint has an x-value less than 0 or greater than 279, or a y-value less than 0 or greater than 191, you are given an error message and no line is drawn. If you bypass Applesoft, you can succeed in giving the line-drawing routine values that will cause wraparound to occur. A more forgiving way to handle this problem would be to clip the lines.

Defining a window gives us greater flexibility. Clipping will be performed against the current window boundaries instead of against the screen boundaries. A couple of simple routines will allow us to change the boundaries of the window to anything we want.

Apple Eccentricities

We've already talked about how the Apple's graphics memory is organized, and its peculiarities will force us to make a concession here. Since each byte of graphics memory contains a color flag and on/off information for seven pixels, we'll save ourselves lots of computation and headaches by restricting the left and right window edges to fall on byte boundaries.

The subroutines in Listing 1 allow you to establish the current window by specifying the upper left corner and the lower right corner. The CHGUPLFT and CHGLOWRT routines will make sure the left and right edges of the window are on byte boundaries, even if the points you specified aren't.

You'll also want to add the following lines of code to the initialization routine so that the graphics window is set to the default full screen size when the INIT routine is called:

```
LDA   #$00
TAX
TAY
JSR   CHGUPLFT      ;INIT SCREEN
                    WINDOW
LDA   #$01          ;TO DEFAULT
                    280 X 192
LDX   #$17
LDY   #$BF
JSR   CHGLOWRT
```

Special Effects

The routine in Listing 2 is of questionable value, but add it to your library of routines anyway and someday you may find a use for it. The routine is based on the peculiarities of the Apple's graphics architecture we just mentioned. There are three ways we can modify a byte of graphics memory:

1. Invert the color flag
2. Invert the seven pixel values in the byte
3. Invert the color flag and the seven pixel values in the byte

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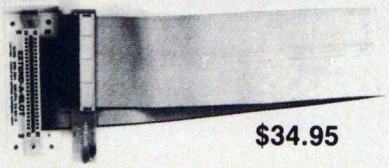

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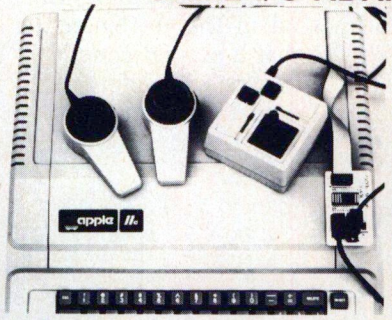

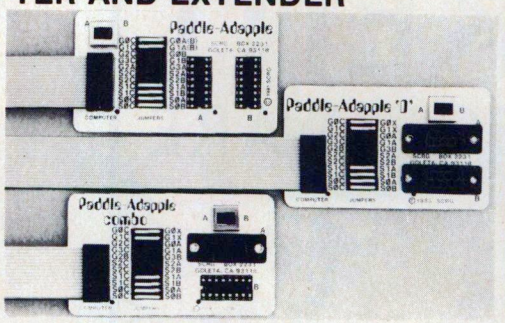

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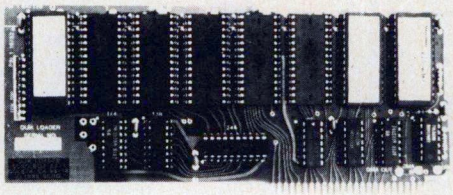
quikLoader™



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To run a program from the quikLoader, bring up the quikLoader catalog (Q-reset), and the names of the programs will be displayed, along with an index letter. Pressing the index letter will instantly load and run the program.

Up to 23 programs on the quikLoader can be displayed on the screen at one time. If you have more programs, you may scroll through the catalog in either direction.

The quikLoader is **ideal** for applications requiring a dedicated computer. Your program can be automatically loaded and run at "power-up".

PROGRAMMING EPROMS

Putting your own programs on the quikLoader is easily done, using a separate EPROM programmer such as the **PROmGRAMER.** For APPLESOFT, INTEGER, or single machine language files, no programming knowledge is necessary. You **will** need experience if you want to save copy-protected or complex programs. The amount of experience necessary depends on the complexity of the program.

COMMERCIAL PROGRAMS

If you have a program that is valuable, it will become **more** valuable when it is instantly available to you. We are actively seeking licenses from software publishers to allow their popular programs to be made available for the quikLoader. Independent authors are encouraged to write programs suitable for the quikLoader. If the author wishes, we will market the program (with appropiate royalties), or the author can take care of all marketing. In either case, we will make known to our customers the availability of these programs.

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Other programs available directly from us or the publishers are, **BARKOVITCH I/O TRACER AND SINGLE STEP TRACE, MICRO/TYPOGRAPHER** from **TIDBIT SOFTWARE, ECHO** speech synthesizer software from **STREET ELECTRONICS,** and **MERLIN** assembler, from **ROGER WAGNER PUBLISHING.** More commercial programs are now in the works.

MEMORY CAPACITY

The quikLoader has eight sockets for EPROMs. These sockets can accommodate standard EPROMs from 2716 to 27512. These types can be freely intermixed. The memory capacity of the quikLoader depends on the EPROMS used. For example, the 2716 can hold 2K of programs, and the 27512 can hold 64K. (Frankly, the current costs of the 27512 is prohibitive,but should come down drastically in the next year.) At this writing, the least cost-per-bit is provided by the 2764, which can hold an 8K program. Using these "chips", the quikLoader becomes a 64K ROM. Using larger capacity EPROMs allows it to become a 128K, 256K, or even a 512K card. If more memory capacity is needed, the quikLoader operating system supports multiple quikLoaders.

INCREASED DISK CAPACITY

Since DOS is loaded from the quikLoader every time the computer is turned on, it is not necessary to take up valuable disk space with DOS. This will give you more than 5% additional space for programs and data on your disks.

ABOUT THE DESIGNER

The quikLoader was designed by Jim Sather, author of UNDERSTANDING THE APPLE][(forward by Steve Wozniak), published by QUALITY SOFTWARE (21601 Marilla Street, Chatsworth, CA 91311 (818) 709-1721).

SYSTEM REQUIREMENTS

The quikLoader plugs into any slot of the APPLE][+ or //e. If used in a][+, a slightly modified 16K memory card is required in slot 0. A disk drive is required to save data.

DOS, INTEGER BASIC, FID, and COPYA are copyrighted programs of APPLE COMPUTER, INC. licensed to Southern California Research Group to distribute for use only in combination with quikLoader.

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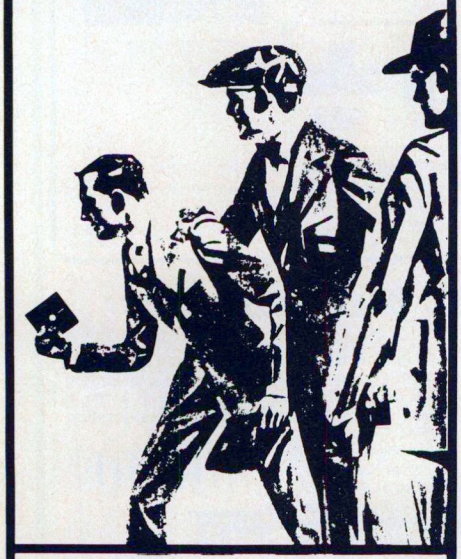

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Circle 25 on Reader Service Card

The routine will perform one of the three "complements" on the current graphics window depending on the value passed in the A-register. The beauty is that a second complement of the same type will restore the screen to its original state. You may find this useful for explosions or "glitter" effects in title pages.

The CMPLMNT routine utilizes the sometimes useful, but always debatable technique of self-modifying cost. Since the three types of complements differ in only two EOR

Listing 1

```
:ASM

                        1    *
                        2    *  CHGUPLFT AND CHGLOWRT ARE USED TO CHANGE
                        3    *  THE GRAPHICS WINDOW BOUNDARIES.  SHAPES CAN
                        4    *  BE DRAWN ONLY WITHIN THE GRAPHICS WINDOW, AND
                        5    *  CMPLMNT ONLY AFFECTS VALUES INSIDE THE WINDOW.
                        6    *  CALL EITHER ROUTINE WITH THE COORDINATE OF THE NEW
                        7    *  GRAPHICS WINDOW CORNER (EITHER UPPER LEFT OR LOWER
                        8    *  RIGHT) WITH XHI IN A, XLO IN X, AND Y IN Y.
                        9    *
                        10           ORG  $A68
                        11   XDIVTBL  EQU  $4C
                        12   TEMPPTR2 EQU  $D2
                        13   LFTXBYTE DS   1
                        14   RTXBYTE  DS   1
                        15   WNDWTOP  DS   1
                        16   WNDWBOT  DS   1
                        17   WNDWRLO  DS   1
                        18   WNDWRHI  DS   1
                        19   WNDWLLO  DS   1
                        20   WNDWLHI  DS   1
0A70: 8D 6F 0A          21   CHGUPLFT STA  WNDWLHI     ;STORE WINDOW LEFT HIGH
0A73: 8E 6E 0A          22            STX  WNDWLLO     ;STORE WINDOW LEFT LOW
0A76: 8C 6A 0A          23            STY  WNDWTOP     ;STORE WINDOW TOP
0A79: 20 90 0A          24            JSR  GETXBYTE    ;COMPUTE BYTE # OF LEFT EDGE
0A7C: 8D 68 0A          25            STA  LFTXBYTE    ;STORE RESULT AS LEFT EDGE
0A7F: 60                26            RTS              ;DONE!
0A80: 8D 6D 0A          27   CHGLOWRT STA  WNDWRHI     ;STORE WINDOW RIGHT HIGH
0A83: 8E 6C 0A          28            STX  WNDWRLO     ;STORE WINDOW RIGHT LOW
0A86: 8C 6B 0A          29            STY  WNDWBOT     ;STORE WINDOW BOTTOM
0A89: 20 90 0A          30            JSR  GETXBYTE    ;COMPUTE RIGHT EDGE BYTE #
0A8C: 8D 69 0A          31            STA  RTXBYTE     ;STORE RESULT
0A8F: 60                32            RTS              ;DONE!
0A90: A4 4C             33   GETXBYTE LDY  XDIVTBL
0A92: 84 D2             34            STY  TEMPPTR2
0A94: A4 4D             35            LDY  XDIVTBL+1   ;STORE POINTER TO XDIVTBL
0A96: 84 D3             36            STY  TEMPPTR2+1  ;IN TEMPPTR SO WE CAN COMPUTE
0A98: A8                37            TAY              ;THE VALUE OF X/7
0A99: F0 02             38            BEQ  LT256XX
0A9B: E6 D3             39            INC  TEMPPTR2+1
0A9D: 8A                40   LT256XX  TXA              ;USE VALUE OF X AS INDEX TO TABLE
0A9E: A8                41            TAY
0A9F: B1 D2             42            LDA  (TEMPPTR2),Y ;LOAD VALUE OF X/7 FROM TABLE
0AA1: 60                43            RTS              ;DONE

--End assembly--

58 bytes

Errors: 0


Symbol table - alphabetical order:

?  CHGLOWRT=$0A80    ?  CHGUPLFT=$0A70       GETXBYTE=$0A90       LFTXBYTE=$0A68
   LT256XX =$0A9D       RTXBYTE =$0A69       TEMPPTR2=$D2         WNDWBOT =$0A6B
   WNDWLHI =$0A6F       WNDWLLO =$0A6E       WNDWRHI =$0A6D       WNDWRLO =$0A6C
   WNDWTOP =$0A6A       XDIVTBL =$4C


Symbol table - numerical order:

   XDIVTBL =$4C         TEMPPTR2=$D2         LFTXBYTE=$0A68       RTXBYTE =$0A69
   WNDWTOP =$0A6A       WNDWBOT =$0A6B       WNDWRLO =$0A6C       WNDWRHI =$0A6D
   WNDWLLO =$0A6E       WNDWLHI =$0A6F    ?  CHGUPLFT=$0A70    ?  CHGLOWRT=$0A80
```

instructions, we can save a little space using this technique. The first part of the CMPLMNT routine stores the proper EOR instructions in the main loop of the routine depending on the value passed in the A-register. Self-modifying can be a dangerous thing (hard to find bugs!) but it can also save you a headache or some space once in awhile.

Listing 2

```
:ASM
                         1    *
                         2    *  CMPLMNT WILL COMPLEMENT ALL THE COLORS
                         3    *  IN THE CURRENT GRAPHICS WINDOW. CALLING CMPLMNT
                         4    *  AGAIN WILL REVERT EVERYTHING BACK TO
                         5    *  ITS ORIGINAL VALUE.  PASS A 0, 1, OR 2 IN THE A
                         6    *  REGISTER DEPENDING ON WHICH TYPE OF COMPLEMENT IS
                         7    *  DESIRED.
                         8    *
                         9            ORG  $AA2
                         10   YTABL    EQU  $EC
                         11   YTABH    EQU  $EE
                         12   TEMPPTR  EQU  $26
                         13   HGRPG    EQU  $E6
                         14   LFTXBYTE EQU  $A68
                         15   RTXBYTE  EQU  $A69
                         16   WNDWTOP  EQU  $A6A
                         17   WNDWBOT  EQU  $A6B
                         18   ROW      DS   1
0AA3: AA                 19   CMPLMNT  TAX
0AA4: F0 17              20            BEQ  CMPLMNT0   ;BRANCH IF TYPE 0 COMPLEMENT
0AA6: A9 EA              21            LDA  #$EA       ;NOP-OUT SECOND EOR FOR TYPE
0AA8: 8D E6 0A           22            STA  CHGLOC+2   ;1 AND 2 COMPLEMENTS
0AAB: 8D E7 0A           23            STA  CHGLOC+3
0AAE: CA                 24            DEX
0AAF: F0 04              25            BEQ  CMPLMNT1   ;IF TYPE 1 COMPLEMENT, BRANCH
0AB1: A9 80              26            LDA  #$80       ;CHANGE FIRST EOR TO 'EOR #$80'
0AB3: D0 02              27            BNE  CMPCONT1   ;FOR TYPE 2 COMPLEMENT
0AB5: A9 FF              28   CMPLMNT1 LDA  #$FF       ;CHANGE FIRST EOR TO 'EOR #$FF'
0AB7: 8D E5 0A           29   CMPCONT1 STA  CHGLOC+1
0ABA: 4C CC 0A           30            JMP  CLOOP1     ;SKIP TYPE 0 COMPLEMENT STUFF
0ABD: A9 FF              31   CMPLMNT0 LDA  #$FF       ;CHANGE FIRST EOR TO 'EOR #$FF'
0ABF: 8D E5 0A           32            STA  CHGLOC+1
0AC2: A9 49              33            LDA  #$49       ;LOAD OPCODE FOR EOR
0AC4: 8D E6 0A           34            STA  CHGLOC+2
0AC7: A9 80              35            LDA  #$80       ;CHANGE SECOND EOR TO 'EOR #$80'
0AC9: 8D E7 0A           36            STA  CHGLOC+3
0ACC: AC 6A 0A           37   CLOOP1   LDY  WNDWTOP    ;STARTING VALUE FOR OUTER LOOP
0ACF: 8C A2 0A           38            STY  ROW
0AD2: AE 69 0A           39   CLOOP2   LDX  RTXBYTE    ;LIMIT OF INNER LOOP (40)
0AD5: B1 EC              40            LDA  (YTABL),Y  ;SCREEN, EOR'ING EACH
0AD7: 85 26              41            STA  TEMPPTR    ;BYTE APPROPRIATELY.
0AD9: B1 EE              42            LDA  (YTABH),Y
0ADB: 05 E6              43            ORA  HGRPG
0ADD: 85 27              44            STA  TEMPPTR+1
0ADF: AC 68 0A           45            LDY  LFTXBYTE
0AE2: B1 26              46   CLOOP3   LDA  (TEMPPTR),Y ;SECOND TIME CHANGES
0AE4: 49 FF              47   CHGLOC   EOR  #$FF       ;EVERYTHING BACK TO
0AE6: 49 80              48            EOR  #$80       ;ITS ORIGINAL STATE
0AE8: 91 26              49            STA  (TEMPPTR),Y
0AEA: C8                 50            INY
0AEB: CC 69 0A           51            CPY  RTXBYTE    ;SEE IF INNER LOOP LIMIT REACHED
0AEE: 90 F2              52            BLT  CLOOP3     ;IF NOT, BRANCH BACK FOR MORE
0AF0: F0 F0              53            BEQ  CLOOP3
0AF2: EE A2 0A           54            INC  ROW        ;INCREMENT CURRENT ROW
0AF5: AC A2 0A           55            LDY  ROW
0AF8: CC 6B 0A           56            CPY  WNDWBOT    ;SEE IF WE'RE DONE
0AFB: D0 D5              57            BNE  CLOOP2
0AFD: 60                 58            RTS             ;DONE

--End assembly--

92 bytes

Errors: 0

Symbol table - alphabetical order:

   CHGLOC  =$0AE4      CLOOP1  =$0ACC      CLOOP2  =$0AD2      CLOOP3  =$0AE2
   CMPCONT1=$0AB7   ?  CMPLMNT =$0AA3      CMPLMNT0=$0ABD      CMPLMNT1=$0AB5
   HGRPG   =$E6        LFTXBYTE=$0A68      ROW     =$0AA2      RTXBYTE =$0A69
   TEMPPTR =$26        WNDWBOT =$0A6B      WNDWTOP =$0A6A      YTABH   =$EE
   YTABL   =$EC


Symbol table - numerical order:

   TEMPPTR =$26        HGRPG   =$E6        YTABL   =$EC        YTABH   =$EE
   LFTXBYTE=$0A68      RTXBYTE =$0A69      WNDWTOP =$0A6A      WNDWBOT =$0A6B
   ROW     =$0AA2   ?  CMPLMNT =$0AA3      CMPLMNT1=$0AB5      CMPCONT1=$0AB7
   CMPLMNT0=$0ABD      CLOOP1  =$0ACC      CLOOP2  =$0AD2      CLOOP3  =$0AE2
```


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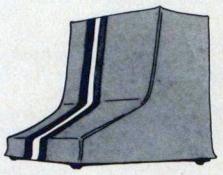

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Demos Away!

Listing 3 is an example program that illustrates the use of CHGUPLFT, CHGLOWRT and CMPLMNT. After you have typed in the listing and assembled it successfully, do the following:

1. From Applesoft, type HGR to display and clear hi-res page 1.
2. BLOAD some hi-res picture you have stored on disk or run a program that generates a picture on page 1.
3. BLOAD all the toolkit routines, including those in Listings 1 and 2.
4. BRUN the demo program

Till Next Time

When we develop our shape-drawing routines we'll be sure and include clipping against the window boundaries. None of the routines presented in past installments had provisions for doing such a thing. You may want to go back and alter the HPLOT, HLINE, and BKGND routines to include the window concept by clipping against the window boundary. If you are keeping the routines as separate files on your development disk, be sure to keep your $ORG addresses straight so that the routines don't end up on top of each other. $EQU's in demo programs will also have to be changed if start addresses of the toolkit routines change.

There may also be other routines you want to add to this collection. One useful routine to add is the random number generator presented by David Sparks in the May '82 issue of *Call -A.P.P.L.E.* The INIT routine could be modified to make a call to RNDINIT to initialize the random number generator. a routine that quickly draws filled or hollow rectangles should also be possible at this point.

We now have routines that duplicate the graphics functionality of Applesoft and have a few freebies thrown in besides. Next time we'll talk about shapes for arcade-quality animation and develop an Applesoft program to generate shape tables. Sayonara!

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Requires: Apple//e with 80-col. board or Apple II Plus with Smarterm 80-col. board and language card. Two disk drives.

Circle 31 on Reader Service Card

Listing 3

```
                        1    *
                        2    * TITLE: DEMO PROGRAM 4
                        3    * FUNCTION: TEST CHGUPLFT, CHGLOWRT, AND CMPLMNT ROUTINES
                        4    * AUTHOR:   RANDI J. ROST
                        5    * DATE:     28-JUL-84
                        6    *
                        7    *
                        8            ORG  $6000
                        9    INIT    EQU  $803
                        10   CHGUPLFT EQU  $A70
                        11   CHGLOWRT EQU  $A80
                        12   CMPLMNT  EQU  $AA3
6000: A9 1B             13   DEM04   LDA  #$1B       ;LOAD A WITH YTABLE ADR HI
6002: A2 00             14           LDX  #$00       ;LOAD X WITH YTABLE ADR LO
6004: 20 03 08          15           JSR  INIT       ;SET UP LOOKUP TABLE PTRS
6007: A9 00             16           LDA  #00
6009: A2 1E             17           LDX  #30
600B: A0 1E             18           LDY  #30
600D: 20 70 0A          19           JSR  CHGUPLFT   ;CHANGE UPPER LEFT TO (30,30)
6010: A9 00             20           LDA  #0
6012: A2 FA             21           LDX  #250
6014: A0 A2             22           LDY  #162
6016: 20 80 0A          23           JSR  CHGLOWRT   ;CHANGE LOWER RIGHT TO (250,162)
6019: A9 00             24           LDA  #0
601B: 20 A3 0A          25           JSR  CMPLMNT    ;DO A TYPE 0 COMPLEMENT
601E: A2 FF             26           LDX  #255
6020: 20 47 60          27           JSR  DELAY      ;PAUSE
6023: A9 00             28           LDA  #0
6025: 20 A3 0A          29           JSR  CMPLMNT    ;RESTORE SCREEN
6028: A9 01             30           LDA  #1
602A: 20 A3 0A          31           JSR  CMPLMNT    ;DO A TYPE 1 COMPLEMENT
602D: A2 FF             32           LDX  #255
602F: 20 47 60          33           JSR  DELAY      ;PAUSE
6032: A9 01             34           LDA  #1
6034: 20 A3 0A          35           JSR  CMPLMNT    ;RESTORE SCREEN
6037: A9 02             36           LDA  #2
6039: 20 A3 0A          37           JSR  CMPLMNT    ;DO A TYPE 2 COMPLEMENT
603C: A2 FF             38           LDX  #255
603E: 20 47 60          39           JSR  DELAY      ;PAUSE
6041: A9 02             40           LDA  #2
6043: 20 A3 0A          41           JSR  CMPLMNT    ;RESTORE SCREEN
6046: 60                42           RTS             ;DONE!
6047: A0 FF             43   DELAY   LDY  #255
6049: 88                44   DELAY2  DEY
604A: D0 FD             45           BNE  DELAY2
604C: CA                46           DEX
604D: D0 F8             47           BNE  DELAY
604F: 60                48           RTS

--End assembly--

80 bytes

Errors: 0

Symbol table - alphabetical order:

   CHGLOWRT=$0A80      CHGUPLFT=$0A70      CMPLMNT =$0AA3      DELAY   =$6047
   DELAY2  =$6049   ?  DEM04   =$6000      INIT    =$0803

Symbol table - numerical order:

   INIT    =$0803      CHGUPLFT=$0A70      CHGLOWRT=$0A80      CMPLMNT =$0AA3

?  DEM04   =$6000      DELAY   =$6047      DELAY2  =$6049
```

Poor-man's Superfast Ramdisk

Steven Meuse

A fair number of purchasers of Extended 80-column cards seem to have been disappointed at the seeming lack of software available to take advantage of their 128K Apple. Despite reports to the contrary, Applewriter *II* (sometimes referred to as Applewriter *IIe*) will make use of some of the extra 64K. Multiplan 1.06 (and later versions) will use the extra memory. Of course, the new double hi-resolution graphic utilities and adventures use the additional memory. There are many more. And while ProDOS encourages programmers to use the extra RAM by turning it into a high-speed Ramdisk, the success of the Apple *IIc* is creating a large installed base of 128K machines out there. So, the prospects are getting better all the time.

In the meantime, this not-inexpensive 64K card goes unused as often as not. Presented here is a short program which will serve as a rudimentary "ramdisk". While it is primarily intended for extremely fast storage and retrieval of high resolution graphics on hi-res page 1, it can be applied to other tasks as well. In order to make use of this program, you will need an Apple *IIc*, or an Apple *IIe* with an Extended (64K) 80-column card, and the Merlin or Big Mac assembler.

The program has three parts, presented in Listings 1, 2, and 3. This program is unusual because it only has around 360 lines of source code in the three files (including comments), and yet it takes several minutes to assemble and produces just over 6K of object code. If you type them in, be sure to save Listings 2 and 3 using the "W)rite text file" option, and using the file names given. This saves the listings as text files, which is necessary in order for the assembler to PUT them while assembling Listing 1.

Once assembled, the object files are saved by the assembler as PSR.AMP and PSR (which stands for Poor man's Superfast Ramdisk). To use the program, initialize the two modules by BRUNning each of them, in either order. For example:

```
10 PRINT CHR$(4) "BRUN PSR"
20 PRINT CHR$(4) "BRUN PSR.AMP"
```

will do just fine. This will locate the actual moving routines in auxiliary memory, and connect Applesoft's ampersand vector. You now have two new commands available, either from the keyboard or within a program. They are &SAVE n and &LOAD n, where n can be an integer from 0 to 8. &SAVE n will copy the image on hi-res page 1 to one of nine "holding areas" located in unused RAM. &LOAD n will copy an image from one of the nine holding areas to hi-res page 1. These new commands execute quite quickly; full-screen animation from Applesoft is now a possibility.

Listing 1

```
 2 ********************************
 3 *                              *
 4 * Poor man's Superfast Ramdisk *
 5 * Listing 1                    *
 6 *                              *
 7 * Requires Apple //c, or Apple *
 8 * //e with extended 80 column  *
 9 * card.                        *
10 *                              *
11 * JULY 3, 1984                 *
12 * Copyright 1984 by            *
13 * Steven Meuse                 *
14 *                              *
15 * Merlin/Big Mac assembler     *
16 *                              *
17 ********************************
18
19 JUMP      =    $00         ;Used for indirect jump
20 A1        =    $3C         ;Used by AUXMOVE
21 A2        =    $3E         ;Used by AUXMOVE
22 A4        =    $42         ;Used by AUXMOVE
23 YTOP      =    $77         ;IMPORTANT: Change YTOP to $7F
24                            ; for non-graphic use!
25 AMPER     =    $3F5        ;Ampersand vector
26 VECTOR    =    $3ED        ;Used by XFER
27 BASE      =    $2000       ;for hires page 1
28 STOR80F   =    $C000       ;Soft switches:
29 STOR80ON  =    $C001
30 RAMWRTOF  =    $C004
31 RAMWRTON  =    $C005
32 ALTZPON   =    $C009
33 READST80  =    $C018
34 READHIRES =    $C01D
35 PAGE2OFF  =    $C054
36 PAGE2ON   =    $C055
37 HIRESOFF  =    $C056
38 HIRESON   =    $C057
39 LCOFF     =    $C082
40 READBK2   =    $C080
41 WRITEBK2  =    $C083
42 READBK1   =    $C088
43 WRITEBK1  =    $C08B
44 AUXMOVE   =    $C311       ;Carry set = transfer main to aux
45 XFER      =    $C314       ;Carry set = transfer main to aux
46                            ;Overflow set = use aux zero page
47 DATA      =    $D995       ;Applesoft parsing routines:
48 SNERR     =    $DEC9
49 IQERR     =    $E199
50 GETBYTC   =    $E6F5
51
52 *  Keyword tokens:
53
54 LOAD      =    182
55 SAVE      =    183
56
57 ********************************
58 *                              *
59 * Parsing routine              *
```

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Circle 36 on Reader Service Card

As written, PSR will not interfere with normal Apple 80-column functions or display. Still, there are a few caveats to note. Memory usage conflicts could be a problem, as PSR uses bank-switched (or "language card") memory in both the main and auxiliary memory areas. See Figure 1 for details of specific memory use for each holding area. In general, don't use holding areas 7 and 8 if you have anything in the normal (main memory) language card— DOS or Integer BASIC, for example. ProDOS users should stay away from holding areas 7, 8, 4, 5, and 6. Although areas 4, 5 and 6 are not used by ProDOS at present, they do conflict with areas Apple has reserved for future use (source: "A Technical Overview of ProDOS" by Sandy Mossberg, *Nibble Magazine* April '84). This in mind, ProDOS users might be better off sticking with ProDOS's real ramdisk.

There are a few non-graphic applications for this program as well. It is very important to change the value of YTOP in Listing 1 from $77 to $7F and reassemble the program before trying any of these! For maximum speed, PSR as listed does not &SAVE or &LOAD the 512 undisplayed

Listing 1 *Continued*

```
60 *                                *
61 **********************************
62
63           ORG   $300
64
65 INSTALL   LDA   #>PARSE
66           STA   AMPER+2
67           LDA   #<PARSE
68           STA   AMPER+1
69           RTS
70
71 PARSE     CMP   #SAVE        ;check for valid command
72           BEQ   OKAY
73           CMP   #LOAD
74           BEQ   OKAY
75           JMP   SNERR
76 OKAY      PHA                ;save command byte
77           JSR   GETBYTC
78           CPX   #9           ;check for valid range (0-8)
79           BLT   OKAY1
80           JMP   IQERR
81 OKAY1     LDA   #>SAVESW     ;prepare for jump to Aux memory
82           STA   VECTOR+1
83           LDA   #<SAVESW
84           STA   VECTOR
85           SEC                ;indicate main to aux
86           CLV                ;indicate use main zero page
87           PLA                ;get back command byte
88           JMP   XFER         ;jump to moving routines in aux mem
89
90           SAV   PSR.AMP
91
92
93 **********************************
94 *                                *
95 * This portion of the program    *
96 * moves the main program to      *
97 * its final destination at       *
98 * $800 in auxiliary memory.      *
99 *                                *
100 **********************************
101
102          ORG   $6000
103
104 INSTALL2 LDA   #>START
105          STA   A1+1
106          LDA   #<START
107          STA   A1
108          LDA   #>END
109          STA   A2+1
110          LDA   #<END
111          STA   A2
112          LDA   #>$800
113          STA   A4+1
114          LDA   #<$800
115          STA   A4
116          SEC
```

Listing 1 *Continued*

```
117           JMP   AUXMOVE
118
119 START     =     *
120
121
122 *********************************
123 *                               *
124 * This is the main program.     *
125 *                               *
126 *********************************
127
128           ORG   $800
129
130 SAVESW     LDY   READHIRES   ;Save the status of the HIRES
131           STY   SAVHIRES    ;and 80STORE switches.
132           LDY   READST80    ;They will have to be changed to
133           STY   SAVSTR80    ;gain access to hires page 1 from here.
134           STY   STOR80ON
135           STY   HIRESON
136 SETLC     CPX   #7          ;Set other memory switches as needed.
137           BGE   GOMOVE
138           STA   ALTZPON
139 GOMOVE    TAY
140           TXA
141           CPY   #SAVE
142           BEQ   GETADRS
143           CLC
144           ADC   #9
145 GETADRS   ASL               ;Jump indirect to correct routine.
146           TAX               ;Note that some of these routines
147           LDA   ADRSTABL,X  ;serve two memory areas. The difference
148           STA   JUMP        ;lies in how the memory switches are set.
149           INX
150           LDA   ADRSTABL,X
151           STA   JUMP+1
152           JMP   (JUMP)      ;might as well...
153
154 ADRSTABL   DA    STORE0
155           DA    STORE1
156           DA    STORE2
157           DA    STORE3
158           DA    STORE4
159           DA    STORE5
160           DA    STORE6
161           DA    STORE5
162           DA    STORE6
163           DA    RECALL0
164           DA    RECALL1
165           DA    RECALL2
166           DA    RECALL3
167           DA    RECALL4
168           DA    RECALL5
169           DA    RECALL6
170           DA    RECALL5
171           DA    RECALL6
172
173
```

bytes in the hi-res buffer. Changing YTOP to $7F causes all 8K to be moved into and out of the holding areas. The resulting program will take slightly longer to execute commands, but this will be visually imperceptible in all graphic applications except high-speed, full-screen animation. To avoid confusion later, the non-graphic version of PSR will be called FULL.PSR.

One example of a non-graphic use of PSR would be to set LOMEM:8192, set HIMEM:16383 and use PSR to swap in and out 9 blocks of variables. The potential here is for 72K of variable space in 8K of actual RAM. To be fair, this approach is not without its pitfalls. All variables must be declared before saving the first block; no more can be added after that without disturbing Applesoft's zero-page variable table pointers. Also, assigning values from one block to another might require some extra programming as there are no "global" variables common to all 9 blocks. One shortcut for simple (numeric) variables would be to define the desired global variables first in the program, and knock LOMEM down 7 bytes for each global variable. Global string variables won't be quite so easy. Nevertheless, it is an idea with possibilities. See Listing 4 for a simple example. Note the filenames FULL.PSR.AMP and FULL.PSR in the listing. Don't forget to change YTOP to $7F! Note also that it is even possible to BSAVE a variable block for storage (much as you might BSAVE a hi-res picture), rather than PRINTing all those values to a text file. It would be much faster, especially with a speed-enhanced DOS.

Another use of PSR could be managing program overlays. While Applesoft overlays might prove cumbersome to implement, assembly language overlays would be a snap. Imagine up to 72K of program code and data fitting into 8K memory space. Now, there's a pleasant thought.

The last few paragraphs of this article will cover some of the technical details on how the program assembles, and how to customize the program's function. It is not required reading in order to use PSR for its intended use, so the non-technical reader may wish to stop here. Hopefully you will put PSR to good use in your programs.

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Circle 33 on Reader Service Card

```
GETBYTE   LDA
          (SOURCE),Y   ;GET A BYTE

          STA
          (TARGET),Y   ;STORE IT
          INY          ;INCREMENT
                        Y REGISTER
          BNE
          GETBYTE      ;TEST AND
                        BRANCH
```

While this is a compact and efficient routine, it is needlessly slow. For each byte transferred, there is (at least) a load, a store, an increment, a test, and a branch. At the other extreme is a routine like this:

```
LDA SOURCE          ;GET A BYTE
STA TARGET          ;STORE IT
LDA
SOURCE+1            ;GET NEXT HIGHER BYTE

STA
TARGET+1            ;STORE IT
LDA
SOURCE+2            ;GET NEXT HIGHER BYTE
STA
TARGET+2            ;STORE IT
.
.                   ;(AND SO ON, UNTIL...)
LDA
SOURCE+8191         ;GET LAST BYTE

STA
TARGET+8191         ;STORE IT
```


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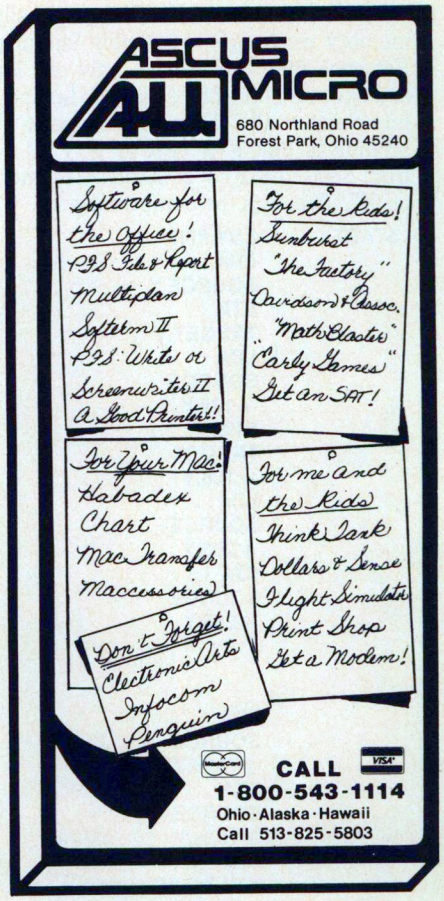
Listing 1 *Continued*

```
174 * This is special version of the generic move routine.
175 * It is needed because the source and target memory
176 * ranges are both mapped into $2000-$3FFF on an 128K Apple.
177
178
179 JMEM      =    $2000
180 JPAGE     =    0
181 STORE0    LDY  #YTOP
182 JMOVE     LUP  64

183           BIT  PAGE2OFF   ;This will be slower that the other
184           LDA  BASE+JPAGE,Y ;moves, but there isn't a faster way.
185           BIT  PAGE2ON
186           STA  JMEM+JPAGE,Y
187 JPAGE     =    JPAGE+128
188           --^

189           DEY
190           BMI  *+5
191           JMP  JMOVE
192           BIT  PAGE2OFF
193           JMP  RETURN
194

195 RECALL0   STA  STOR80F
196           STA  RAMWRTOF
197           PUT  LOAD
198
199 JMEM      =    $4000
200 STORE1    PUT  SAVE
201 RECALL1   PUT  LOAD
202


203 JMEM      =    $6000
204 STORE2    PUT  SAVE
205 RECALL2   PUT  LOAD
206
207 JMEM      =    $8000
208 STORE3    PUT  SAVE
209 RECALL3   PUT  LOAD


210
211 JMEM      =    $A000
212 STORE4    PUT  SAVE
213 RECALL4   PUT  LOAD
214

215 * This is another special case for the two 4K banks
216 * in each of the two "bank-switched memories",
217 * usually called a language card area.
218


219 JMEM      =    $D000
220 JPAGE     =    0
221 STORE5    BIT  WRITEBK1
222           BIT  WRITEBK1
223           LDY  #YTOP
224 JMOVE     LUP  32


225           LDA  BASE+JPAGE,Y
226           STA  JMEM+JPAGE,Y
227 JPAGE     =    JPAGE+128
228           --^
229           DEY
230           BMI  *+5
```

Listing 1 *Continued*

```
231             JMP   JMOVE
232 JPAGE       =     Ø
233             BIT   WRITEBK2
234             LDY   #YTOP
235 JMOVE       LUP   32
236             LDA   BASE+$1ØØØ+JPAGE,Y
237             STA   JMEM+JPAGE,Y
238 JPAGE       =     JPAGE+128
239             --^
240             DEY
241             BMI   *+5
242             JMP   JMOVE
243             JMP   RETURN
244
245 JPAGE       =     Ø
246 RECALL5     BIT   READBK1
247             LDY   #YTOP
248 JMOVE       LUP   32
249             LDA   JMEM+JPAGE,Y
250             STA   BASE+JPAGE,Y
251 JPAGE       =     JPAGE+128
252             --^
253             DEY
254             BMI   *+5
255             JMP   JMOVE
256 JPAGE       =     Ø
257             BIT   READBK2
258             LDY   #YTOP
259 JMOVE       LUP   32
260             LDA   JMEM+JPAGE,Y
261             STA   BASE+$1ØØØ+JPAGE,Y
262 JPAGE       =     JPAGE+128
263             --^
264             DEY
265             BMI   *+5
266             JMP   JMOVE
267             JMP   RETURN
268
269
270 JMEM        =     $EØØØ
271 STORE6      BIT   WRITEBK1
272             BIT   WRITEBK1
273             PUT   SAVE
274
275 RECALL6     BIT   READBK1
276             PUT   LOAD
277
278
279 RETURN      STA   RAMWRTON    ;just in case it was changed...
280             BIT   SAVSTRØØ    ;Now restore ØØSTORE and HIRES to
281             BMI   RETURN2     ;their state on entry.
282             STA   STORØØOF
283             BPL   RETURN3     ;always taken
284 RETURN2     STA   STORØØON
285 RETURN3     BIT   SAVHIRES
286             BMI   RETURN4
287             STA   HIRESOFF

288             BPL   RETURN5     ;always taken
289 RETURN4     STA   HIRESON
290 RETURN5     BIT   LCOFF       ;Bank Applesoft ROMs back in,
291             LDA   #>DATA      ;and prepare to exit via DATA.
292             STA   VECTOR+1
293             LDA   #<DATA
294             STA   VECTOR
295             CLC               ;indicate aux to main
296             CLV               ;indiciate use main zero page
297             JMP   XFER        ;go back to APPLESOFT via DATA
298                               ;note that XFER will properly set
299                               ;the ALTZP switch.
300
301 SAVHIRES    HEX   ØØ
302 SAVSTRØØ    HEX   ØØ
303
304 LENGTH      =     *-SAVESW
305
306 END         =     START+LENGTH
307             SAV   PSR
```

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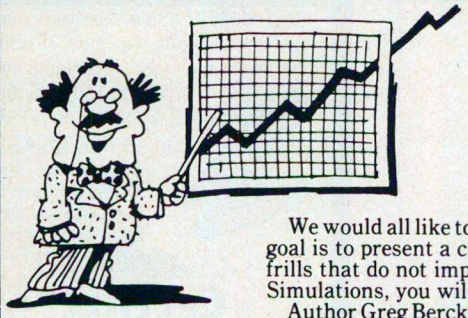
This represents the fastest possible memory move from assembly language. For each byte transferred, only one load and one store take place, with no testing or branching at all. The disadvantage to this scheme is that it is 48K long. PSR has from $800 to $1FFF in auxiliary memory, or 6K. This was the compromise:

```
START   LDY #7F
        LDA
        SOURCE,Y
        STA
        TARGET,Y
        LDA
        SOURCE-
        +128,Y
        STA
        TARGET-
        +128,Y
        LDA
        SOURCE-
        +256,Y
        STA
        SOURCE-
        +256,Y
        .
        .
        .
        LDA
        SOURCE-
        +7936,Y
        STA
        SOURCE-
        +7936,Y
        DEY
        BMI DONE
        JMP START
```

Listing 2

```
 1 ************************************
 2 *                                  *
 3 * Poor man's Superfast Ramdisk     *
 4 *                                  *
 5 * Listing 2: The SAVE module       *
 6 * (This must be saved as a         *
 7 *  text file named "SAVE")         *
 8 *                                  *
 9 * Merlin/Big Mac assembler         *
10 *                                  *
11 ************************************
12
13
14 JPAGE    =     Ø
15          LDY   #YTOP
16 JMOVE    LUP   64
17          LDA   BASE+JPAGE,Y
18          STA   JMEM+JPAGE,Y
19 JPAGE    =     JPAGE+128
20          --^
21          DEY
22          BMI   *+5
23          JMP   JMOVE
24          JMP   RETURN
```

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Circle 40 on Reader Service Card

Listing 3

```
1 ********************************
2 *                              *
3 * Poor man's Superfast Ramdisk *
4 *                              *
5 * Listing 3: The LOAD module   *
6 * (This must be saved as a     *
7 *  text file named "LOAD")     *
8 *                              *
9 * Merlin/Big Mac assembler     *
10 *                             *
11 ********************************
12
13
14 ]PAGE     =     Ø
15           LDY   #YTOP
16 ]MOVE     LUP   64
17           LDA   ]MEM+]PAGE,Y
18           STA   BASE+]PAGE,Y
19 ]PAGE     =     ]PAGE+128
20           --^
21           DEY
22           BMI   *+5
23           JMP   ]MOVE
24           JMP   RETURN
```

This method has several advantages. At 392 bytes, it is much shorter than 48K. With a little careful programming, 14 such modules can cover the &LOADs and &SAVEs for all 9 holding areas, and still fit into 6K. For each byte transferred, only one load and store take place, and incrementing, testing and branching occur 64 times for 8K, rather than 8192 times as in the first example. The final advantage is that by loading the Y register with #$77 instead of #$7F, the 512 undisplayed bytes in the hi-res buffer are skipped entirely. With this technique, it is possible to move a hi-res page in less time than that given in the second example (61999 machine cycles vs. 65536).

The reason for placing the actual moving routines in separate files are these. First, this enables the assembler to invoke them as often as needed. Second, it reduces typing time and enhances the ease with which changes can be made. Third, it enables the assembler to produce a lot of repetitive object code with a only few lines of source code. This is done using Merlin's abilility to handle variable labels, which are the labels that are preceded with a "]" in the listings. Unlike normal labels, variable labels can be assigned new values as many times as needed. Using the LUP pseudo-opcode, Merlin is directed to assemble a few lines of code 64 times. Included in that loop is the line]PAGE =]PAGE+128, and the variable is updated

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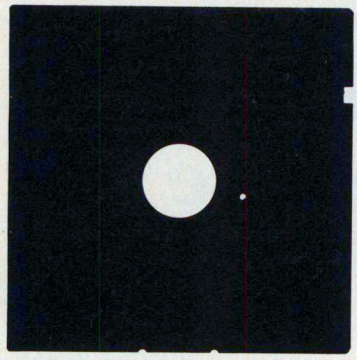
Circle 41 on Reader Service Card

Listing 4

```
10 REM  LISTING 4
20 REM  PSR ARTICLE
30 TEXT : HOME : VTAB 24
40 PRINT  CHR$ (4)"BRUN FULL.PSR
    .AMP": PRINT  CHR$ (4)"BRUN
    FULL.PSR"
50 REM  THESE VERSIONS MOVE ALL
    8K (YMOVE = $7F)
60 HGR : REM   JUST FOR THE FUN
    OF IT
70 HIMEM: 16383: LOMEM: 8178
80 REM 8178 LEAVES SPACE FOR TWO
     GLOBAL VARIABLES
90 A=0:B = 0: REM THE GLOBAL VA
    RIABLES
100 DIM X(1599)
110 FOR A = 0 TO 8
120 PRINT "Creating block "A
130 FOR I = 0 TO 1599:X(I) =  INT
    ( RND (1) * 100): NEXT
140 &  SAVE A
150 B=0: FOR I = 0 TO 1599:X(I)
    = B: NEXT : REM  NOT NECESS
    ARY BUT INTERESTING
160 NEXT
170 REM  NOW ALL 14400 ELEMENTS
    HAVE BEEN CREATED
180 PRINT : PRINT "Enter a numbe
    r (0-99)"
190 PRINT "and the program will
    search through"
200 PRINT "the nine variable blo
    cks and report"
210 INPUT "occurrences of that n
    umber ";B
220 FOR A = 0 TO 8
230 PRINT "Searching block "A
240 &  LOAD A
250 FOR I = 0 TO 1599
260 IF X(I) = B THEN  PRINT B" f
    ound in record #"I + A * 160
    0
270 NEXT
280 NEXT
290 GOTO 180

]
```

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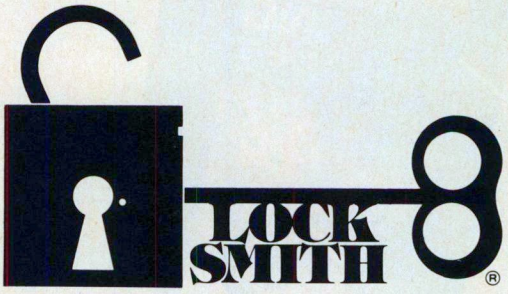

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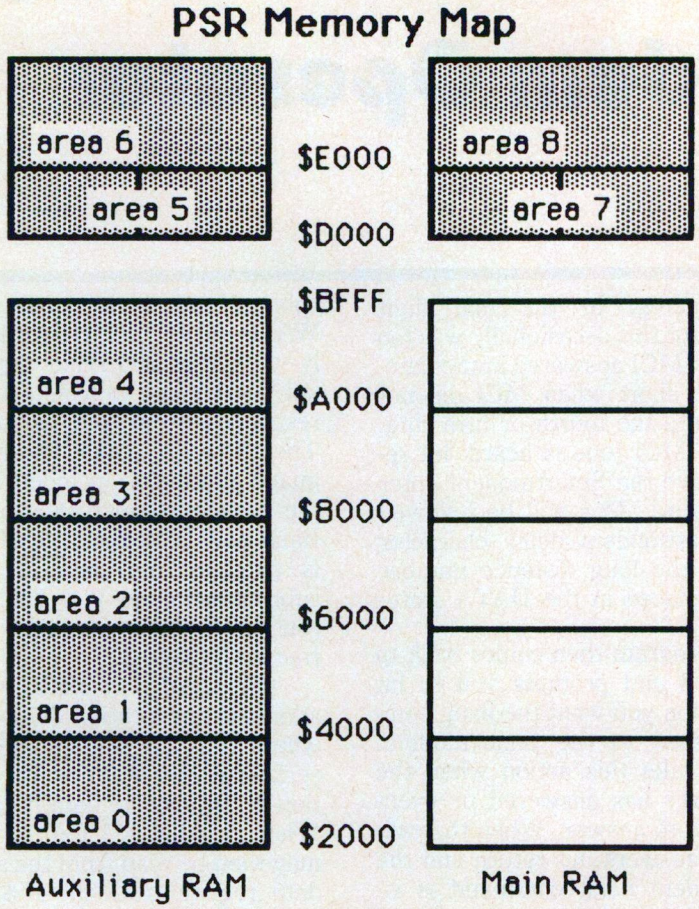
Circle 38 on Reader Service Card

Figure 1

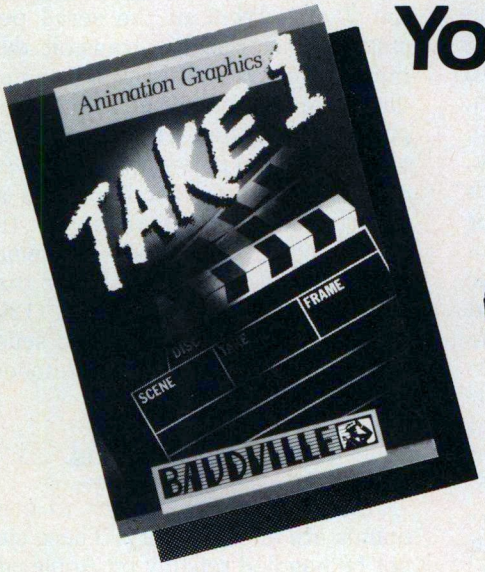


on each pass through the loop, which in turn affects the object code produced by the statements LDA BASE+]PAGE,Y and STA]MEM+]PAGE,Y. The final reason for putting these modules into separate files is that macros cannot be used for this technique.

The last consideration for those wishing to understand or modify this program is that it takes advantage of the new memory-banking scheme found in the Apple *//e* and Apple *//c* computers. Specifically, when the switches HIRES and 80STORE are on, the PAGE2 switch can be used to select which hi-res page 1 ($2000-$3FFF) will be present in the memory map. This function supersedes the setting if the RAMREAD and RAMWRITE switches, so it is possible to have hi-res page 1 from main memory and most of the holding areas from main or auxiliary memory present in the memory map at the same time. The sole exception is holding area 0, which is also mapped into $2000-$3FFF. This is handled as a special case in PSR.

The reason for that lengthy explanation is simply this: Very high speed transfers are only possible to and from hi-res page 1, owing to the memory mapping of the Apple *//c* and *//e*. If it is important to use hi-res page 2 instead of hi-res page 1, a new technique will be needed.

Hopefully, this program will prove itself useful in your library. Enjoy!



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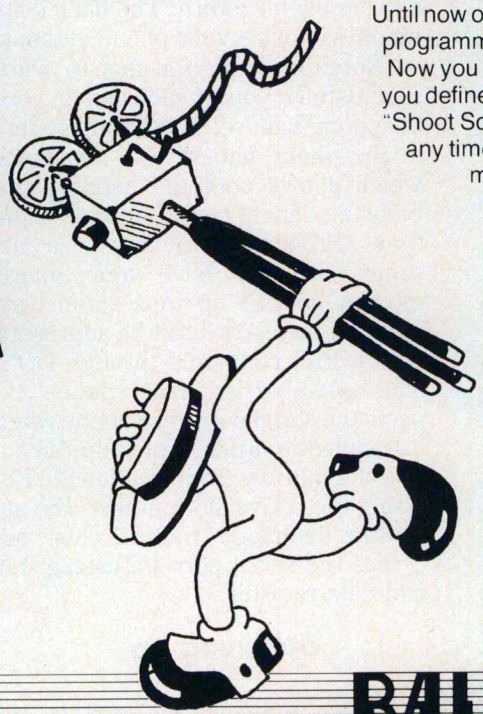

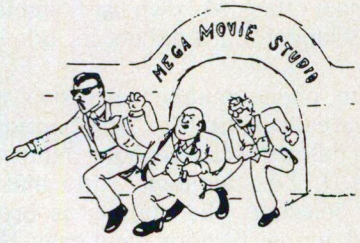

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Circle 34 on Reader Service Card

Smartmodem Operator

Ken Kashmarek

SMARTMODEM Operator is a program which can be used to dial your telephone numbers, or display and set status of your Smartmodem. I originally wrote the program to place long distance phone calls through MCI. Someone gave me a cheap telephone handset which has pushbuttons, but uses rotary dialing. MCI service requires tone dialing in order to enter the required password and phone number. With Smartmodem Operator, I let my Hayes Smartmodem place the call, and pick up the voice on the handset after the call has been answered.

Reaching Out

In addition to placing calls on MCI, it will also handle regular direct dial long distance calls. For MCI, you must place your local MCI number in line 295, and your MCI password (replace 555-1212 with the phone number, and XXXXX with your password). The comma after the password is a Smartmodem delay (2 seconds) before tone dialing the long distance number. The phone numbers are entered in the DATA statements beginning with line 1100. The first DATA statement tells the program how many phone numbers are in the list. Sample phone numbers include the *Call -A.P.P.L.E.* Hot-Line and main office. My own list is significantly longer, but I did not include it here.

The phone number selection is presented using the description which follows each telephone number in the DATA statement. After making a selection, the number is presented for verification, and may be aborted by entering a response other than "Y." When MCI is dialed, the program comes back to the screen before proceeding. This allows you to control the delay that may exist while waiting for the local MCI number to answer. I tried to use a fixed delay of eight seconds (four Smartmodem delay characters in the dial digit stream), but this occasionally was too long when MCI answered immediately, or too short when MCI did not answer until the fourth or fifth ring. After the MCI tone is heard, hit return to have the Smartmodem enter the password. This will be followed by a Smartmodem delay character and then the long distance number that you placed in the DATA statement.

The program then comes back to the screen and prompts you to hit return when you want the hang command issued to the Smartmodem. You will take this action when the called party has answered or eventually fails to answer. When the called party answers, hit return and the Smartmodem hang command is issued to take the Smartmodem out of the circuit. Be sure that you have picked up your handset before hitting return, or else the call will be disconnected. If the called party fails to answer, leave your hand set down, and simply hit return. The hang command will place your phone on hook.

Note: In order for this to work successfully, you should connect your telephone handset and Smartmodem to the phone line with a T-adapter which allows both the handset and Smartmodem to be active at the same time. Proper functioning also assumes that you have your Smartmodem hooked up to a serial card and that serial card can be addressed with a PR# command through DOS. The assembly language routine expects the serial port to be active when it is called in order to pick up the active slot number from location $07F8. Using the active slot number, the assembly language routine then accesses the serial port status register and data register.

Speeding Up

When originally put together, the program handled Smartmodem responses entirely in Applesoft (using WAIT and PEEK). However, this only worked at 300 Baud. Applesoft is not fast enough to handle 1200 Baud responses from the Smartmodem. Therefore, a small assembly language routine is included to handle the Smartmodem responses for 300 Baud and 1200 Baud. This program is patched into page 3 with the subroutine in lines 800-850. The subroutine in lines 900-930 calls the routine in page 3.

The serial port status register is addressed at location $C084 + $N0, where N is the slot number of your serial card. Bit 0 of this memory location is the receive data register flag. When this bit is 1 (on), a character may then be read from the serial port data register ($C085 + $N0). The Smartmodem response characters come back with the high bit set to 0 (bit 7 off). Bit 1 of the serial port status register is the transmit data buffer flag. When this bit is 1, a new data byte may be placed in the serial port data register. However, I activated the serial port with PR# and used a PRINT command to send all Smartmodem commands to the Smartmodem. This works fine since the data will not go out faster than the Smartmodem can take it (1200 Baud). The PRINT command sends commands just as the Smartmodem expects to receive them.

Choosing Options

Smartmodem responses to commands are another story. These cannot be handled reliably by Applesoft. Each Smartmodem response is preceded by several control characters (usually two carriage returns and one line feed). These control characters are ignored. Response characters are then placed into a buffer in page 3. The response characters (OK, CONNECT, RING, NO CARRIER, ERROR, and CONNECT 1200; corresponding response digit codes 0, 1, 2,

(Continued on page 37)

Listing 1

```
SMARTMODEM  OPERATOR
BY KEN KASHMAREK

30  IF  PEEK (768) <  > 76 OR  PEEK
    (769) <  > 10 OR  PEEK (770)
     <  > 3 THEN  GOSUB 800
100 D$ =  CHR$ (4):FL = 0:SL = 2:
    O = 1:F = 31:G = 31:P3 = 768

105 I$ = "IN#":P$ = "PR#": DIM C(
    30)
110 U = 49284 + SL * 16: REM $C08
    4+SL*16
115 V = 49285 + SL * 16: REM $C08
    5+SL*16
120  READ N: DIM PH$(N),ID$(N)
125  FOR I = 1 TO N: READ PH$(I),
    ID$(I): NEXT
130  DIM D$(16),S$(16): FOR I = 0
     TO 16: READ D$(I): NEXT
135  PRINT D$P$;SL: PRINT "AT S0=
    0": FOR I = 1 TO 999: NEXT I
    :S =  PEEK (U): PRINT D$P$;0
    :B = S: GOSUB 660
140  IF  NOT B(0) THEN  PRINT  CHR$
    (7);"PLUG IN THE SMARTMODEM
    AND TURN IT ON.": GOSUB 665:
     GOTO 135
145  PRINT D$P$;SL: PRINT "ATI": GOSUB
    900: PRINT D$P$;0:PC$ = "SMA
    RTMODEM 300 (ERROR)": IF A$ =
    "8" THEN PC$ = "CHRONOGRAPH"

150  IF  MID$ (A$,1,2) = "12" THEN
    PC$ = "SMARTMODEM 1200 REVIS
    ION " +  MID$ (A$,3,1)
155  TEXT : HOME
160  HTAB 13: INVERSE : PRINT "SM
    ARTMODEM OPERATOR": NORMAL
165  PRINT : PRINT "PRODUCT CODE=
    ";PC$
170  PRINT : PRINT "1. PLACE A CA
    LL"
175  PRINT : PRINT "2. DISPLAY SM
    ARTMODEM STATUS"
180  PRINT : PRINT "3. DISPLAY BI
    T MAPPED REGISTERS"
185  PRINT : PRINT "4. SET SMARTM
    ODEM PARAMETERS"
190  PRINT : INPUT "   SELECT ";S
    $
195  IF S$ = "" THEN  PRINT : PRINT
    "GOODBYE.": END
200 S =  VAL (S$)
205  ON S GOTO 210,370,440,670: GOTO
     155
210  TEXT : HOME
215  HTAB 9: INVERSE : PRINT "SMA
    RTMODEM PHONE DIALER": NORMAL
     : PRINT
220  FOR I = 1 TO N
225  PRINT I;". "; TAB( 5);ID$(I)
230  NEXT
235  PRINT : INPUT "    SELECT ";
    S$
240  IF S$ = "" THEN 155
245 S =  VAL (S$): IF S > N THEN
     PRINT  CHR$ (7): GOTO 210
250 PH$ = PH$(S)
255  IF S = 1 THEN  PRINT : INPUT
    "PHONE NUMBER? ";PH$: IF PH$
     = "" THEN 210
260  HOME : PRINT : PRINT "PHONE
    #=";PH$
```


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Circle 45 on Reader Service Card

Listing 1 *Continued*

```
265  PRINT : INPUT "PROCEED (Y=DO
     S/M=MCI)? ";M$: IF M$ <  > "
     Y" AND M$ <  > "M" THEN 210
270  PRINT : PRINT D$P$;SL
275  PRINT "AT S0=0"
280  GOSUB 900
285 PW$ = "1-"
290  IF M$ <  > "M" THEN 325
295 MCI$ = "555-1212":PW$ = "XXXX
    X,"
300  PRINT "AT D T ";MCI$;","
305  GOSUB 900
310  PRINT D$P$;0
315  PRINT  CHR$ (7): INPUT "HIT
     RETURN TO ENTER PASSWORD";Q$

320  PRINT : PRINT D$P$;SL
325  PRINT "AT D T ";PW$;PH$;","
330  GOSUB 900
335  PRINT D$P$;0
340  PRINT  CHR$ (7): INPUT "HIT
     RETURN TO DROP MODEM";Q$
345  PRINT : PRINT D$P$;SL
350  PRINT "AT H0"
355  GOSUB 900
360  PRINT D$P$;0
365  GOSUB 665: GOTO 155
370  TEXT : HOME
375  HTAB 12: INVERSE : PRINT "SM
     ARTMODEM STATUS": NORMAL : PRINT

380 X =  PEEK (37):FL = 1
385  FOR I = 0 TO 16
390  PRINT D$P$;SL
395  PRINT "AT S";I;"?"
400  GOSUB 900:S$(I) = A$
405  PRINT D$P$;0
410  VTAB X + 1
415  NEXT I:FL = 0
420  FOR I = 0 TO 16
425  PRINT "S";I; TAB( 4);"=";S$(
     I);" ";D$(I)
430  NEXT
435  GOSUB 665: GOTO 155
440  TEXT : HOME
445  HTAB 12: INVERSE : PRINT "BI
     T MAPPED REGISTERS": NORMAL
     : PRINT
450 X =  PEEK (37):FL = 1
455  FOR I = 13 TO 15
460  PRINT D$P$;SL
465  PRINT "AT S";I;"?"
470  GOSUB 900:S$(I) = A$
475  PRINT D$P$;0
480  VTAB X + 1
485  NEXT I:FL = 0
490  PRINT "S13=";D$(13): PRINT
495 B =  VAL (S$(13)): GOSUB 660
500  PRINT "BIT 0=";B(0);" UNDEFI
     NED"
505  PRINT "BIT 1=";B(1);" RESULT
      CODE SET (BASIC)": IF B(1) THEN
      VTAB  PEEK (37): HTAB 25: PRINT
     "(EXTENDED)"
```

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Circle 32 on Reader Service Card

Listing 1 *Continued*

```
510  PRINT "BIT 2=";B(2);" PARITY
      CHECKING (DISABLED)": IF B(
     2) THEN  VTAB  PEEK (37): HTAB
     25: PRINT "(ENABLED) "
515  PRINT "BIT 3=";B(3);" PARITY
      (ODD)": IF B(3) THEN  VTAB
      PEEK (37): HTAB 16: PRINT "
     (EVEN)"
520  PRINT "BIT 4=";B(4);" NUMBER
      OF DATA BITS (7)": IF B(4) THEN
      VTAB  PEEK (37): HTAB 29: PRINT
     "(8)"
525  PRINT "BIT 5=";B(5);" UNDEFI
     NED"
530  PRINT "BIT 6=";B(6);" BUFFER
      OVERFLOW FLAG (OFF)": IF B(
     6) THEN  VTAB  PEEK (37): HTAB
     30: PRINT "(ON) "
535  PRINT "BIT 7=";B(7);" EIGHTH
      DATA BIT (SPACE)": IF B(7) THEN
      VTAB  PEEK (37): HTAB 25: PRINT
     "(MARK) "
540  GOSUB 665
545  VTAB 3: CALL  - 958: PRINT "
     S14=";D$(14): PRINT
550 B =  VAL (S$(14)): GOSUB 660
555  PRINT "BIT 0=";B(0);" AUTO A
     NSWER (DISABLED)": IF B(0) THEN
      VTAB  PEEK (37): HTAB 21: PRINT
     "(ENABLED) "
560  PRINT "BIT 1=";B(1);" LOCAL
     ECHO (DISABLED)": IF B(1) THEN
      VTAB  PEEK (37): HTAB 20: PRINT
     "(ENABLED) "
565  PRINT "BIT 2=";B(2);" RESULT
      CODES (ENABLED)": IF B(2) THEN
      VTAB  PEEK (37): HTAB 22: PRINT
     "(DISABLED)"
570  PRINT "BIT 3=";B(3);" RESULT
      CODE SENT (DIGITS)": IF B(3
     ) THEN  VTAB  PEEK (37): HTAB
     26: PRINT "(WORDS) "
575  PRINT "BIT 4=";B(4);" COMMAN
     D RECOGNITION (ENABLED)": IF
     B(4) THEN  VTAB  PEEK (37): HTAB
     29: PRINT "(DISABLED)"
580  PRINT "BIT 5=";B(5);" DIAL (
     TOUCH TONE)": IF B(5) THEN  VTAB
      PEEK (37): HTAB 14: PRINT "
     (PULSE)      "
585  PRINT "BIT 6=";B(6);" SPEAKE
     R (DISABLED)": IF B(6) THEN
      VTAB  PEEK (37): HTAB 17: PRINT
     "(ENABLED UNTIL CARRIER)"
590  PRINT "BIT 7=";B(7);" PERMAN
     ENT SPEAKER (DISABLED)": IF
     B(7) THEN  VTAB  PEEK (37): HTAB
     27: PRINT "(ENABLED)"
595  GOSUB 665
600  VTAB 3: CALL  - 958: PRINT "
     S15=";D$(15): PRINT
605 B =  VAL (S$(15)): GOSUB 660
610  PRINT "BIT 0=";B(0);" SEE BI
     T 4"
615  PRINT "BIT 1=";B(1);" SEE BI
     T 5"
620  PRINT "BIT 2=";B(2);" CALL M
     ODE (ANSWER)": IF B(2) THEN
      VTAB  PEEK (37): HTAB 19: PRINT
     "(ORIGINATE)"
625  PRINT "BIT 3=";B(3);" DUPLEX
      (HALF)": IF B(3) THEN  VTAB
      PEEK (37): HTAB 16: PRINT "
     (FULL)"
630  PRINT "BIT 4&5=";B(4);B(5);"
      BAUD RATE (UNDEFINED)": IF
     B(4) AND  NOT B(5) THEN  VTAB
      PEEK (37): HTAB 22: PRINT "
     (110)"
635  IF  NOT B(4) AND B(5) THEN  VTAB
      PEEK (37): HTAB 22: PRINT "
     (300)        "
```


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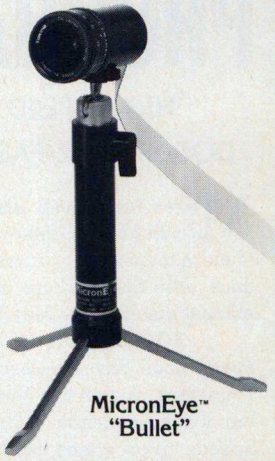

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Listing 1 *Continued*

```
640  IF B(4) AND B(5) THEN  VTAB
      PEEK (37): HTAB 22: PRINT "
     (1200)      "
645  PRINT "BIT 6=";B(6);" CARRIE
     R (OFF)": IF B(6) THEN  VTAB
      PEEK (37): HTAB 17: PRINT "
     (ON) "
650  PRINT "BIT 7=";B(7);" UNDEFI
     NED"
655  GOSUB 665: GOTO 155
660  FOR J = 0 TO 7:W = B:B =  INT
     (B / 2):B(J) = W - B * 2: NEX'
     : RETURN
665  PRINT : INPUT "HIT RETURN TO
      PROCEED ";Q$: RETURN
670  TEXT : HOME : HTAB 8: INVERSE
     : PRINT "SET SMARTMODEM PARA
     METERS": NORMAL
675  PRINT : FOR I = 0 TO 15: PRINT
     "S";I; TAB( 5);D$(I): NEXT
680 X =  PEEK (37)
685  VTAB X + 1: PRINT : CALL  -
     868: INPUT "ENTER COMMAND ";
     Q$: CALL  - 868: IF  RIGHT$
     (Q$,1) = "?" THEN FLAG = 1
690  IF Q$ = "" THEN 155
695  PRINT D$P$;SL: PRINT "AT";Q$
     : GOSUB 900: PRINT D$P$;0
700  CALL  - 868: PRINT A$
705 FLAG = 0: GOTO 685
800  GOTO 820
810 H$ = H$ + "ND9C6G": FOR I = 1
     TO  LEN (H$): POKE 511 + I,
     ASC ( MID$ (H$,I,1)) + 128:
     NEXT : POKE 72,0: CALL  - 1
     44: RETURN
820 H$ = "0300:4C 0A 03 00 00 61
     03 00 81 03 AD F8 07 29 0F 0
     A 0A 0A 0A A8 B9 84 C0 6A 90
      FA B9 85 C0 C9 20 90 F3 A2
     00 9D 61 03 E8 B9 84 C0 6A 9
     0 FA B9 85 C0 C9 20 B0 EF 8E
      04 03 AD 03 03 D0 01 60 B9
     84 C0 ": GOSUB 810
830 H$ = "0340:6A 90 FA B9 85 C0
     C9 20 90 F3 A2 00 9D 81 03 E
     8 B9 84 C0 6A 90 FA B9 85 C0
      C9 20 B0 EF 8E 07 03 60 84
     C0 6A 90 FA B9 85 C0 60 00 0
     0 00 00 00 00 00 00 00 00 00
      00 00 00 00 00 00 00 00 00
     00 00 ": GOSUB 810
840 H$ = "0380:00 00 00 00 00 00
     00 00 00 00 00 00 00 00 00 0
     0 00 00 00 00 00 00 00 00 00
      00 00 00 00 00 00 00 00 ": GOSUB
     810
850  RETURN
900  POKE 771,FLAG: CALL 768
910 L =  PEEK (772):M =  PEEK (77
     3) +  PEEK (774) * 256:A$ =
     "": FOR K = 0 TO L - 1:A$ =
     A$ +  CHR$ ( PEEK (M + K)): NEXT
920  IF FLAG THEN L =  PEEK (775)
     :M =  PEEK (776) +  PEEK (77
     7) * 256:B$ = "": FOR K = 0 TO
     L - 1:B$ = B$ +  CHR$ ( PEEK
     (M + K)): NEXT
930  RETURN
1100  DATA 3
1110  DATA "",PROMPT FOR NUMBER
1140  DATA 206-872-9004,CALL -A.P
     .P.L.E. HOT-LINE
1150  DATA 206-872-2245,CALL -A.P
     .P.L.E. OFFICE
1200  DATA RING COUNT FOR ANSWERI
     NG
1201  DATA NUMBER OF RINGS DETECT
     ED
1202  DATA ESCAPE CODE CHARACTER
1203  DATA CARRIAGE RETURN CHARAC
     TER
1204  DATA LINE FEED CHARACTER
1205  DATA BACKSPACE CHARACTER
1206  DATA DIAL TONE WAIT-SECONDS
1207  DATA CARRIER WAIT TIME-SECO
     NDS
1208  DATA COMMA PAUSE TIME-SECON
     DS
1209  DATA CARRIER DETECT TIME-1/
     10 SEC.
1210  DATA DELAY UNTIL HANGUP-1/1
     0 SEC.
1211  DATA TOUCH TONE INTERVAL-MI
     LLISEC.
1212  DATA ESCAPE GUARD TIME-1/50
      SEC.
1213  DATA UART STATUS REGISTER
1214  DATA OPTION REGISTER
1215  DATA FLAG REGISTER
1216  DATA TEST MODE REGISTER
```


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Ultra-Fast Garbage

New FRE command collects a memory full of 6000 strings that are half garbage in two seconds. DOS 3.3 takes 12 minutes. FRE is so fast it is not noticeable during run of most programs.

Clock Dating

Automatic date stamping of disk files is set up for 6 kinds of clocks or Hello manual date entry. New DATE command will auto-insert date in correspondence.

All times in seconds. (Time Test programs available)		DAVID DOS-II	ProDOS	DOS 3.3
TEXTFILES (100 Sectors)	TSAVE	8.0	NO	NO
	TLOAD	6.2	NO	NO
(791 Strings, 32 chars ea)	WRITE	29.3	28.0	88.4
	READ	24.3	16.3	83.8
	PRINT/READ	44.2	45.9	117.1
(442 Sectors, 7 x 500)	APPEND	142.3	142.9	1231.2
APPLESOFT (100 Sectors)	*SAVE	6.4	16.4	33.1
	LOAD	5.0	4.0	23.5
INTEGER (100 Sectors)	*SAVE	6.6	NO	33.4
	LOAD	4.9	NO	23.4
BINARY (100 Sectors)	*BSAVE	7.3	18.4	28.7
	BLOAD	5.8	4.8	24.5
48K PROGRAM SPACE (With 3 Bufs avail)	APPLESOFT	36,352	NO	36,352
	INTEGER	36,352	NO	36,352
	BINARY	36,352	34,816	36,352
64K PROGRAM SPACE (With 4 Bufs avail)	APPLESOFT	46,592	32,256	35,756
	INTEGER	46,592	NO	35,756
	BINARY	46,592	41,728	35,756

*Add 5 seconds for Verify. Apple II, Applesoft & ProDOS are trademarks of Apple

Ten New DOS Commands

1. HIDOS moves DOS above 48K memory.
2. FRE makes ultra-fast garbage collection.
3. DATE stamp files. Clock or manual dating.
4. TLOAD speed loads all Text Files to mem.
5. TSAVE speed saves Text Files from memory.
6. TLIST lists all Text Files to screen/printer.
7. DUMP Binary/Ascii to screen or printer.
8. DISA disassembles Binary to screen/printer.
9. AL prints program Address & Length.
10. / is a one keystroke Catalog.

Identical Operation

All new commands operate identical to old DOS commands on the keyboard & in programs.

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Circle 28 on Reader Service Card

(Continued from page 32)

3, 4, and 5) are then retrieved by the Applesoft program. The response characters are followed by a carriage return which is read by the assembly language program. For some responses, the carriage return is followed by a line feed, which is ignored.

The other program options allow you to display the Smartmodem registers, display the bit mapped registers, and enter Smartmodem commands. When entering commands, Smartmodem Operator sends the AT command prefix to the Smartmodem, so it is only necessary to enter the essential command characters (i.e., F1 to set full duplex). Do not enter Q1 as this will suppress result codes from the Smartmodem and the Applesoft program will hang.

In the command entry mode, you may display the status of a single register by entering Sn? (n = Smartmodem register number; 0 through 16). However, do not enter multiple register display requests in one command. The results will be lost (use option 2 of the main menu). Many of the Smartmodem commands set specific bits in the bit mapped registers (V, E, F, Q) while others are set by the configuration switches. Consult your Smartmodem documentation for complete information.

You should also consult your serial card documentation regarding addressing of the serial port status register and data register. The addresses used by this program are the same for the Prometheus Versacard and SSM SIO serial card. More complex usage of your serial port and Smartmodem requires a package such as Ascii Express, The Professional. Writing code in this area is not for the faint of heart. You will get results much faster by obtaining a communications package to do the job for you.

Set the serial card slot number in line 100 of the Applesoft program. The variable is SL. The Applesoft program looks for a received character in line 135 to determine if your Smartmodem is operating. This may not always work, so have the Smartmodem running when you RUN Smartmodem Operator.

Well, that is about it. There is nothing sophisticated here. Just some simple Applesoft code and a very short assembly language interface to deal with the serial port in order to handle Smartmodem responses. In order to be truly effective, the serial port interrupt capability should be active so a program can dynamically respond to the Smartmodem. This is necessary for auto answer and unattended operation. Maybe we can address this some other time.

Listing 2

```
                        ********************************
                        *                              *
                        * SMARTMODEM INPUT INTERFACE   *
                        * KEN KASHMAREK CALL-A.P.P.L.E.*
                        *                              *
                        ********************************
                              ORG   $0300
0300: 4C 0A 03                JMP   SMART1
0303: 00              FLAG    DFB   0             ;0=JUST ONE
0304: 00              LEN1    DFB   0             ;FIRST
0305: 61 03                   DA    BUF1          ; RESPONSE
0307: 00              LEN2    DFB   0             ;SECOND
0308: 81 03                   DA    BUF2          ; RESPONSE
                      SLOT    EQU   $7F8          ;$CN
                      BASE    EQU   $C084         ;STATUS BYTE
                      DATA    EQU   $C085         ;DATA BYTE
                        ********************************
                        * GET THE ACTIVE SLOT NUMBER
                        ********************************
030A: AD F8 07        SMART1  LDA   SLOT          ;GET $CN
030D: 29 0F                   AND   #$0F          ;CLEAR 7-4
030F: 0A                      ASL                 ;MAKE $N0
0310: 0A                      ASL
0311: 0A                      ASL
0312: 0A                      ASL
0313: A8                      TAY                 ;INDEX
                        ********************************
                        * RETRIEVE THE FIRST RESPONSE
                        ********************************
0314: B9 84 C0        WAIT1   LDA   BASE,Y        ;STATUS BYTE
0317: 6A                      ROR                 ;BIT 0 TO C
0318: 90 FA                   BCC   WAIT1         ;0=NO DATA
031A: B9 85 C0                LDA   DATA,Y        ;DATA BYTE
031D: C9 20                   CMP   #'            ' ;SKIP CTL
031F: 90 F3                   BLT   WAIT1         ; CHARS.
0321: A2 00                   LDX   #0
0323: 9D 61 03        FILL1   STA   BUF1,X        ;SAVE DATA
0326: E8                      INX                 ; CHAR & LEN
0327: B9 84 C0        WAIT2   LDA   BASE,Y        ;WAIT FOR NXT
032A: 6A                      ROR                 ;BIT 0 TO C
032B: 90 FA                   BCC   WAIT2         ;0=NO DATA
032D: B9 85 C0                LDA   DATA,Y        ;GET DAT BYTE
0330: C9 20                   CMP   #'            ' ;CTL-CHR?
0332: B0 EF                   BGE   FILL1
0334: 8E 04 03                STX   LEN1          ;KEEP LENGTH
                      *
0337: AD 03 03                LDA   FLAG          ;SECOND
033A: D0 01                   BNE   SMART2        ; RESPONSE?
033C: 60                      RTS
                        ********************************
                        * RETRIEVE THE SECOND RESPONSE
                        * AFTER A REGISTER INQUIRE SN?
                        ********************************
                      SMART2  EQU   *
033D: B9 84 C0        WAIT3   LDA   BASE,Y
0340: 6A                      ROR
0341: 90 FA                   BCC   WAIT3
0343: B9 85 C0                LDA   DATA,Y
0346: C9 20                   CMP   #'
0348: 90 F3                   BLT   WAIT3
034A: A2 00                   LDX   #0
034C: 9D 81 03        FILL2   STA   BUF2,X
034F: E8                      INX
0350: B9 84 C0        WAIT4   LDA   BASE,Y
0353: 6A                      ROR
0354: 90 FA                   BCC   WAIT4
0356: B9 85 C0                LDA   DATA,Y
0359: C9 20                   CMP   #'
035B: B0 EF                   BGE   FILL2
035D: 8E 07 03                STX   LEN2
0360: 60                      RTS
                      *
                      BUF1    DS    32
                      BUF2    DS    32
```

Something Over 32 Bits

Questions & Answers About Apple's Lisa and Macintosh 32-bit Computers

Dave Redhed

I am a proud but baffled owner of the Mac Software Supplement and have had little luck figuring out how most of the MacStuff utilities work. I've been experimenting and learning a bit at a time, but there must be a faster way. Why not explain the utilities one or more per issue in your column? Also, what's this about four disks of utilities as mentioned in the October column? I received three. Is there really a MacStuff 4?

Your question implies that you did not buy the supplement as a puzzle to test your wits, determination, and ingenuity. Too bad! As far as I can tell it would have helped. The closest thing I found to instructions is the somewhat misleading sentence, "Most of the files on the MacStuff disks have notes in their 'Get Info' fields." While this statement is true (as you have undoubtedly found out), it is not terribly helpful. The "notes" typically amount to a one sentence description of the purpose of the utility. I do not know if additional instructions exist, but I do not believe they were distributed as part of the Supplement. Your suggestion about publishing some information about the utilities is a good one, but this column may be a bit restrictive for tutorials. Maybe we can slip something in elsewhere.

My "four" diskettes included the MacWorks/Lisa Bug diskette which I should not have included in the count of Mac utility disks.

I have an Apple II + and am planning to buy a 512K Mac. I have used and like very much The General Manager and ScreenWriter II by Sierra On-Line, Inc. What is available on the Mac that would do as good a job for me? Also, I am interested in more information about the Mac, such as one could get in a newsletter. Is there one?

I am unfamiliar with the two programs you mentioned, but in asking around, they were described to me as a reasonably good, elementary data base program and word processor, respectively. There are a number of data base programs out for Mac, and not so many word processors. If ScreenWriter is a full-function word processor, I would doubt that MacWrite would satisfy you. Microsoft Word will probably do the trick, when it comes out. I just heard that it was delayed (again) until the first of the year.

From what I was told about The General Manager, I gathered that is not one of the more sophisticated data base managers. This being the case, you may be satisfied with one of the current programs available. I have only looked at one of the data base programs (FileVision) and I think it left out some key data base features in its drive to incorporate graphics. MacWorld is probably the most complete source of information about Mac software, and I would suggest you look there to get some initial ideas about possible software that would be of interest. A few which I have seen advertised are MegaFiler, Hayden:Base, Helix, and MacLion. I am sorry that I cannot be of more direct help in matching you up with programs close to what you have now. If someone writes in with helpful comments I will pass them on.

The Mac/Lisa SIG of A.P.P.L.E. has just organized itself to the point of saying that they will put out a newsletter, but I do not think that the first issue has been released. You could write to Michael and Lisa Storrie-Lombardi at the club to get more information. Also, the Mac/Lisa room (#5) of the A.P.P.L.E. Crate bulletin board has lots of information being shared between club members. Of course, there

are numerous other Mac groups and bulletin boards around the country, some of which have been identified in the A.P.P.L.E. Crate.

There have been articles in InfoWorld, The Wall Street Journal, and USA Today claiming that Apple is going to drop Lisa sometime in 1985. I am on the verge of buying a Lisa but I don't want to get a machine that expensive only to see it abandoned a short time later. What ARE Apple's plans for Lisa?

You cannot imagine how many times I have asked myself that same question, asked Apple that same question, and had others ask me that same question. For starters, I know only one thing for certain—in early November 1984, you can still order a Lisa from an Apple dealer. Beyond this rather mundane fact, everything else seems to be pure speculation. A statement from Apple was published in the October 15th *Signal*. This statement was made in response to two articles in a September and October *Computer Retail News* which also said Lisa was being dropped. Mike Gabrielson (editor of *Signal*) requested and received a statement out of Tim McNally, the Lisa Product manager. With Mike's permission, I will include a few significant quotes from Tim's statement. "We have just made a substantial investment in a building in Dallas devoted entirely to Lisa production.... Lisa shipments continue to be strong....Lisa is an integral part of our office strategy....I hope these conditions and actions show to you our commitment to Lisa. We will in the coming months reinforce that commitment to our sales force and our dealers."

Only my natural shyness (and space limitations) keep me from delving into my true feelings on this subject. I have been personally committed to Lisa for 18 months and I continue to be very positive about Lisa, but only Lisa owners have any sympathy. Tim's reassuring words tell one story and Apple's visible actions (or lack of them) tell another story.

My advice to those who ask about buying a Lisa has been quite consistent for the last six months. If you like what you see in Lisa today and you think it is a good buy, buy it. If additional software for the Lisa Desktop is a major factor to you, don't buy it. I personally believe that there will be more software written for Lisa, but that is of more significance to current Lisa owners, not prospective buyers.

Why it is that Apple seems determined to keep the Apple II going forever but couldn't keep the *III* going I don't know. How they started out so strongly with Lisa in 1983 and faded so rapidly is an even bigger mystery to me. How they think they are going to expand the Macintosh into a viable business computer and crack the business market they could not crack with Lisa is an even bigger, bigger mystery to me. And over the next hill came a bigger and shaggier dog...

Last month you didn't say anything about the Toolkit activities. How's it going?

Quite well. I now have about 70 members in the Toolkit Users' Group and the first newsletter should have been distributed by the time you read this. Eleven people representing eight organizations met in Indianapolis on the 2nd and 3rd of November to discuss possibilities for Toolkit maintenance. Most people received the Toolkit by early November and should have received the 3.0 version of the Workshop by the end of November.

I have had all the software for a month or so and I am very impressed with it. The Workshop has been improved in several ways and the Toolkit documentation is quite good. I have found QuickPort to be a more significant tool than I had anticipated. I compiled and installed several of the Toolkit example programs and they are very helpful. I have not had an opportunity to get to my Toolkit development yet, but I am really looking forward to it.

We would like to encourage readers who are interested in Apple's 32 bit computers to send in questions they would like to see answered in this column. Write to : 32 Bit Questions, Call -A.P.P.L.E. Editorial Dept., 21246 68th Ave. S., Kent WA 98032.

The Byte Before Christmas

```
Twas the byte before finishing
And all through the disk,
Not a feature was working.
Now the contract's at risk.

The program is hung
By a bug hidden there.
The code's all spaghetti,
And the design's only fair.

The advance is all gone.
Every penny is spent.
All visions of big royalties
Once sparkling, just went.

With nary a menu,
'Twas to be command-driven,
With parsers and error traps
For which I had striven.

And so I sit here
My head's in my hands,
So much left to do
To live up to my fans.
But I could be down,
My life in despair.
But Christmas is here.
WHOOPEEE!  I
              don't
                   CARE!

---

Happy Holidays and good cheer!
Sign up for more classes:
Any time of the year!

                   Charlie Stillman
                   A.P.P.L.E.
```


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MacArticles Wanted

In response to the growing demand for useful, objective information about the Macintosh and related hardware/software (including Lisa), *Call—A.P.P.L.E.* intends to pay more attention to this family of products. You can help us by applying your technical expertise and writing skills to this task. Please send articles, reviews, and proposals to our editorial office, indicating the Macintosh relevance in your cover letter for early consideration.

A.P.P.L.E. Doctor

Bruce F. Field

Please folks, don't send me a disk with your latest 50,000 line program and ask why it doesn't work. Seriously, I realize that many readers have problems and no where else to turn, but I get many more questions a month than I have space or time to answer. This is an apology of sorts to those people whose questions don't get answered or take a long time to get answered. I try to answer questions that are likely to be of interest to as many people as possible. Questions on product availability are especially tough as I get my information the same way everybody else does—by reading magazines and talking to other people. Also please consider that the lead time between writing this column and publication is as much as four months. So much for the soapbox; on to the questions and a few letters.

DOUBLE YOUR HI-RES

Dave Pyne of Kalamazoo Michigan wrote in response to a question of using double hi-res with an Apple II or II+.

"There is a hardware mod available which gives your Apple II (+) the ability to do double hi-res graphics, and it is one of the real bargains in this world.

The reference for this system is BYTE, November, 1983, and the article is "Double the APPLE II's color choices" by Robert H. Sturges Jr., on pages 449-463. Mr. Sturges also offers a disk of demonstration programs for $14.95 and a kit for the hardware mod at $25.00 (November 1983 prices).

The resolution is not great, a bit grainy perhaps, but you can expand the colors on your APPLE with the modification, and it seems to work in similar ways to the //e hi-res graphics."

MULTI-FUNCTION CARD CORRECTION

Patricia Gowland wrote to correct an answer I made regarding multi-function cards for the Apple. A dual function interface card is available from Videx, PSIO, which she is using to drive two printers. The Videx card works with CP/M and Wordstar.

COMPUTER AS TYPEWRITER

A number of months ago I published a little routine to allow C. Itoh printer users to have anything typed on the keyboard printed immediately on the printer. I still am not sure of the usefulness of this, as the printhead does not necessarily remain at the last character printed, but instead apparently moves to the margin. However there seems to be a lot of interest in this; I've had requests for a program for other printers. If anybody knows how to do the same thing with an IDS 560 printer I'll pass it along. Paul Pagel of Enfield, CT says that Apple Writer //e can also be used as an ET (electronic typewriter).

"Apple Writer //e provides a means (via the Additional Functions Menu, selection I) to connect the Apple //e keyboard to the printer. This option is described (incompletely) on p. 138 of the Apple Writer //e manual. What is not mentioned is that, if you have an "intelligent" printer-interface card, you must turn off the screen echo or you'll get a jumble of letters on the screen, and eventually wind up with nothing but unintelligible junk on the display. Some time ago, John Morand of Apple Computer clued me in on this. After selecting option I from the Additional Functions Menu, type CONTROL-I D (you can use the TAB key to generate the CONTROL-I code). The screen now will behave itself."

Paul's CONTROL-I D code is specific to the interface card he is using. Yours may be different—for example Grappler uses CONTROL-I 80N. Check your printer interface card manual to be sure.

INCREASING GAME PORT OPTIONS

Q. *I have a //e. When the Koala Pad is plugged into the internal game I/O port, the joystick plugged into the back does not function properly. How can I use both without removing one or the other?*

A. The two game I/O sockets on the //e are wired in parallel. That is the joystick connections are electrically wired together so that plugging in two devices will cause them to interfere with one another. What you need is some kind of switch that will let you select which device you want to use. TG Products makes such a switch, called Select-A-Port, that lets you plug in up to about 4 devices and select which one is connected to the computer. One problem with this is that the connecters on the switch are all similar to the connector inside the //e, i.e. a 16-pin DIP connector, so that your joystick with a DB-9 connecter will have to be modified to work with this switch.

A simple adapter can be made to convert the DB-9 connector to a 16-pin DIP. Radio Shack sells a female DB-9 connector that you can plug your joystick into (part no. 276-1538), and a 16-pin DIP Header (part no. 276-1980) that will plug into the Select-A-Port. You will need to solder 9 wires (to make sure you have all the functions) between different pins on the two connectors. The pin numbers are listed on page 168 of the Apple //e Reference Manual and I will repeat them here.

DB-9 pin #	16-pin pin #
2	1
7	2
1	3
6	4
5	6
8	10
4	7
9	11
3	8

FACILITATING FILE FORMATS

Q. *As you are probably aware, several other computer systems write out multiple fields per record, and in free field format, a blank is used to separate each field. DOS 3.3 or Applesoft can't read this type of file unless an elaborate looping program using GET is used to branch after reading a blank. This method is real slow. Is there a way to change Applesoft so that a blank can be used as a string or numeric delimiter?*

A. I don't know of any simple way to use a blank as a delimiter as this is tied in with routines in ROM as well as DOS. It is possible to write a short program (preferably in machine language for speed) to break a string with blanks into a series of smaller strints once it has been read in from disk. But it is possible, and even easier, to use DOS 3.3 and Applesoft to create the equivalent of multiple fields per record. First we need to remember how sequential text files are stored with DOS 3.3. Whenever we write a string to disk it is saved with a carriage return following the characters, and then the next string saved starts immediately after the first string. This works fine until we want to make the first string longer, then we have to rewrite all the strings in the file.

Suppose instead that we use a random-access text file. In this case, when the file is created, we have to specify a record length. Each record starts the specified number of bytes after the last one. Now we are free to save several strings (fields) in each record as long as the total number of characters for the strings doesn't exceed the record length. If we want to change any one of the strings in a record we will only need to rewrite all the strings in that individual record. We are not limited to a particular number of strings for each record; some records can have more than others. Also, we don't have to completely fill the record, as the total number of characters in each record can be less than the record length. Here's an example to show how this works.

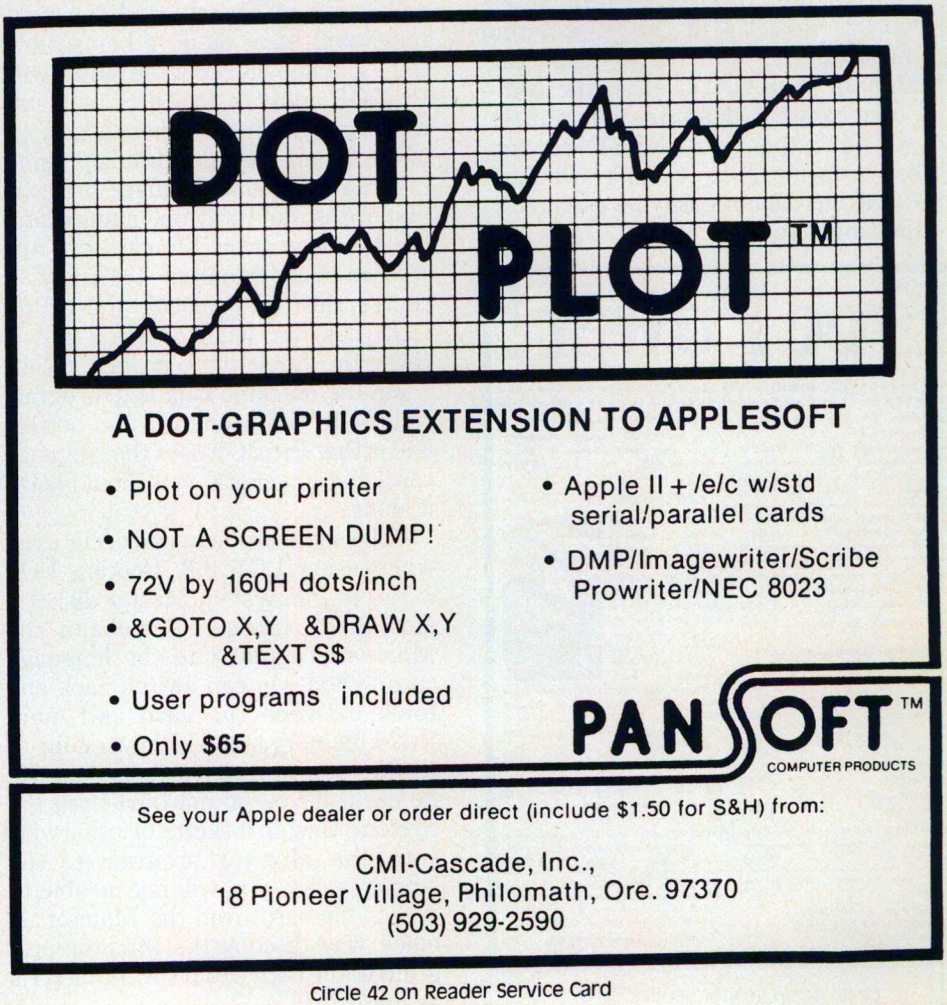
```
100   D$ = CHR$(4)
110   PRINT D$; "OPEN
      FILENAME,L100"
120   PRINT D$; "WRITE
      FILENAME,R1"
130   FOR I = 1 TO 3
140   PRINT "RECORD 1 - FIELD ";I
150   NEXT I
160   PRINT D$; "WRITE
      FILENAME,R2"
170   FOR I = 1 TO 4
180   PRINT "RECORD 2 - FIELD ";I
190   NEXT I
200   PRINT D$; "CLOSE
      FILENAME"
```

Line 110 opens a random-access text file with a length of 100 bytes per record. Line 120 prepares the system to write in record number 1. Lines 130 through 150 write three strings into record number 1 with the strings separated by carriage returns. Line 160 prepares the system to write in record number 2 and lines 170 through 190 write four strings in record number 2. Line 200 finishes by closing the file. To read the data back from disk the following program can be used.

```
300   D$ = CHR$(4)
310   PRINT D$; "OPEN
      FILENAME,L100"
320   PRINT D$; "READ
      FILENAME,R2"
330   FOR I = 1 TO 4
340   INPUT A$ : PRINT A$
350   NEXT I
360   PRINT D$; "READ
      FILENAME,R1"
370   FOR I = 1 TO 3
380   INPUT A$ : PRINT A$
390   NEXT I
400   PRINT D$; "CLOSE
      FILENAME"
```

This program works like the first one. Line 310 opens the previously created data file. You must remember the record length specified when the file was created and use the same record length here. Line 320 prepares the system to read record number 2 first. I just did this to prove that the records are truly random access and can be read in any order. Lines 330 to 350 read the four strings in record 2 and print them out. Lines 360 to 390 read the three strings in record 1 and print them out. You must also remember exactly how many strings were stored in each record, if you try to read too many strings from the record you may get garbage or an END OF DATA error message. Normally this won't be a problem because you'll probably have the same number of strings in each record. If not, you could have the first string in each record contain the number of strings in that record.

We have the same limitations on using the Applesoft INPUT statement with strings as we normally have, i.e. you can't have any punctuation in the strings. If this is a problem replace the INPUT command with one of the ubiquitous input anything routines. (One can be found in *Call -A.P.P.L.E. In Depth, Number One, All About Applesoft.*)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Circle 42 on Reader Service Card

KEYBOARD KINKS

Q. *What approach is required to modify the Apple IIe KEYIN routine as described in "Write-A.P.P.L.E.," June 1984 (p. 67, "Keyboard Compatibility" by John Russ)? You can't key it in using the MONITOR. As John describes, I'd like to have the DELETE key do just that. It's confusing to jump from Apple Writer to normal operation and find little checkerboard cursor blocks on the screen when I use the DELETE key.*

A. For those who don't remember, John's routine was designed to trap the delete key in the KEYIN routine in the monitor and replace it with a backspace. A small problem is that John's routine is supposed to overlay the normal KEYIN routine in the Monitor, but this routine has been moved in the IIe to handle lower case input and output. Thus if you copy the Monitor program to the language card and then type in the routine from the Monitor you usually mistakenly get dumped back into Applesoft after the changes are made. Although parts of the Monitor program have been destroyed, Applesoft sometimes works correctly in the 40-column mode. But, if you try to enter the Monitor with CALL -151, the computer hangs. I don't see any simple way out of this, as the KEYIN routine has been moved to a bank switched ROM and cannot easily be used from the language card.

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Circle 44 on Reader Service Card

I have played around with this routine a little bit without much success in creating a reliable routine for both 40 and 80 columns. Perhaps John Russ will write a sequel routine to correct this problem.

LANGUAGE CARD AND THE MONITOR

Q. *From the Monitor program (in my Apple II+) I can activate my language card with two references to memory location $C083. This is accomplished by typing the address, a carriage return, typing it again, and hitting carriage return again. I am unable to do this after booting with ProDOS, entering BASIC and CALLing -151 from there. I suspect it has something to do with the stack. What's wrong?*

A. The problem is that turning on the language card causes the memory on the card to replace the ROM memory that contains the Monitor program and the Applesoft interpreter. If you have not previously loaded a copy of the Monitor program into the language card, the Monitor program will cease to operate and the computer will hang or do other strange things. When you boot the Apple with ProDOS, most of ProDOS loads into the language card and there is no copy of the Monitor program. It is possible to write a machine language program that turns the card on, manipulates the memory, turns the card off, and returns to the Monitor. This may, of course, destroy ProDOS, and if ProDOS has not been disabled it will cause the Apple to do strange things when the machine language program returns to the Monitor. The bottom line is that ProDOS uses the language card, and in general you should leave it alone.

The same problem can occur even when using DOS 3.3. Booting DOS 3.3 from the System Master diskette also loads Integer Basic and the Monitor program into the language card. Then you can switch back and forth between the card and main ROM memory and whichever copy of the Monitor program is turned on will be used. If you do not boot from the System Master diskette or otherwise copy the Monitor program to the language card you will not be able to access the card from the Monitor. A quick way to copy the Monitor program to the card (from the Monitor) is as follows.

```
C081 [cr]
C081 [cr]
F800 < F800.FFFFM [cr]
```

The two C081 addresses turn the card on so that it can be written to, but still allow the ROM memory to be read. This is unusual, you are reading from and writing to two physically different memories at the same address. The last line reads the Monitor ROM starting at $F800 and copies it to the language card at $F800. After this you may want to write protect the language card; typing C080 [cr] will allow you to read the RAM memory on the card but not write to it. Typing C083 [cr] will allow you to read and write to the RAM memory on the card.

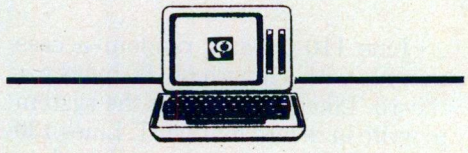
PRINTER INTERFACING

Q. *I have an Apple II+, a Pkaso interface card, and a C. Itoh Prowriter printer. I have been trying to use the horizontal tab on the printer (ctrl-I) but the Pkaso uses ctrl-I as a lead-in for all its commands. Pkaso says you can change the lead-in character by POKEing some other number (than 9) into location 1145. They say: "To disable commands, poke a code that is never printed, such as 255, into 1145. The lead-in character is restored to ctrl-I each time the Pkaso is activated (with a PR#1, etc.) in case you forgot or mistyped the lead-in." I put a POKE 1145,255 command after the PR#1 command but it doesn't work. Can you see any reason?*

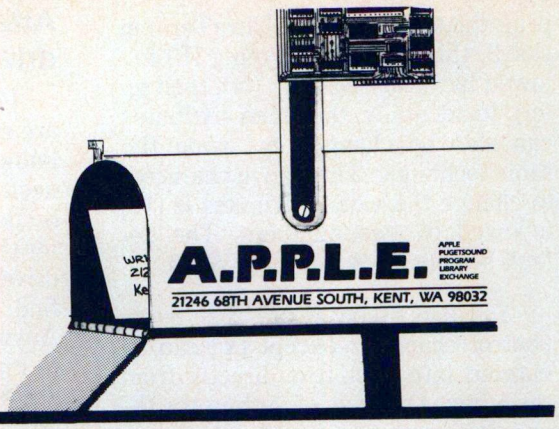
A. According to Pkaso you have to print something (anything) after initializing the card but before doing the POKE. Using your example I have added a PRINT.

```
100 PR-1 : PRINT
110 POKE 1145,255
```

However you really should turn on the printer using the DOS command PRINT CHR$(4)"PR#1" or DOS commands may not work later in your program.



Write—A.P.P.L.E.



Readers' Forum

Future Directions

I have been a member of A.P.P.L.E. for many years, and a sometimes contributor to its publications and products. In spite of many fancier magazines to which I subscribe, *Call –A.P.P.L.E.* is the one I most look forward to receiving, and the only one I nearly always read from cover to cover.

I have been working with a wide variety of computers since 1957 and with the Apple II since 1978, yet I still find a variety of interesting and useful information in each issue. In spite of this, you keep it readable and useful for the computer novice as well. It's a remarkable balance that hopefully will be maintained, even as Apple's product line grows and changes.

It seems that the biggest disappointment among club members is that the Macintosh was designed as an appliance more than as a computer, and those of us who want to get our fingers "into the works" are stymied. I suggest that the Greatest benefit you can achieve for your readers over the next year would be to provide as much information as possible on the inner workings of the Mac and its firmware, and practical information on utilizing them at a more primitive level. Why should hobbyists be deprived of the machine's elegance?

Please include reviews of system programming tools, with emphasis on how well they provide access to the Macintosh Toolbox, etc. I would especially like to see reviews of assemblers, debuggers, and compilers for languages such as Modula 2, C, Forth, Ada and Pascal. *Call –A.P.P.L.E.* can and should continue to provide more useful information than any of Apple's manuals. Yes, I have *Inside Macintosh*, and I'm very disappointed in it. Now show us what a bunch of dedicated users can do!

Sincerely yours,

Dan Paymar
Enhanceware

On Apples, Macs, and Pascal

I joined A.P.P.L.E. in Jan., 1980. Your magazine and "Hotline" have been of tremendous service to me. My dues represent money well spent. I wish you well but I sense a lack of direction (?Softalk demise?).

A. Macintosh

Whether you like Big Blue or not, have you noticed that the main IBM PC magazine has more depth than *all* of the various Apple magazines combined? What would be the point of a splinter group Mac.newsletter? I still use my Apple II more than my Mac, but if it split off I'm sure I would drop one subscription. Why not put more beef in the current magazine to attract subscribers?

B. Apples

Apple Computer, Inc. sowed the seed of discontent best by not releasing freely how to interface a printer to the Macintosh. I am *dying* to attach the quiet and fast Hewlett-Packard Inkjet printer. Can you show how to do this? I'd love to put my Imagewriter on the auction block. Any H-P gurus out there? Also, I would like to buy an Applesoft ROM card, Apple doesn't even list them anymore.

C. Pascal

I purchased the Pascal 1.2 Update just under the wire. Trying to run it with Chris Wilson's fine keyboard driver, Pascal 1.2 decided it would have nothing to do with me. System. Attach was not version 1.2. I called the "Hotline" looking for the quick and dirty solution. They relayed me to International Apple Corps who just as quickly referred me nicely back to the dealer. IAC is no longer in the Attach-BIOS business. Is there any doubt that dealers care nothing about Pascal? So, I called Tom Woteki in Maryland. Imagine my disbelief when even Dr. Wo told me he knew of the problem but not the solution! Twenty minutes of prime time A.T.&T. rates to Apple Computer Inc. brought a kindly Apple employee up to date, but has not yielded a solution yet. My update disk APPLE1: is full of ProDOS Machine Language Interface System Call Exercisor. I can not prove whether that is part of the problem or just a free gift. Too bad the "USUS" Pascal group went into hyperspace leaving us earthlings behind.

Sincerely,

Lawrence Simon, M.D.

Using AppleWriter II with UltraTerm

Here is a tip for those of you who have an UltraTerm card by Videx and who use AppleWriter II. There is a way to use more of the features of the card than are presented on the UltraTerm preboot disk. The preboot menu gives you only three options:

1: 24 lines—no interlace
2: 32 lines—with interlace
3: 48 lines—with interlace

The option that I like the best is the 80 x 24 with interlace. It is possible to get this option by printing control V 4 to the UltraTerm card. To do this, boot your system with the preboot disk and select option 1: 24 lines—no interlace. Then simply create a document with only two characters in it—[V]4. Next, change the print destination to the slot which contains the printer interface and

print the text. With the UltraTerm in slot 3, this is done by typing [P] followed by ? (cr), then pd3 (cr), then np (cr). Incidentally, the video attributes can also be changed by using the same technique. The lead in character to change the video attributes is [W] followed by two numbers. The default setting is [W]02. Try [W]20.

You should be aware that every control character except [V] can be entered into your text directly from the editor. One way of getting the [V] into the text is to use the glossary. The glossary will accept all control characters. Enter the glossary with [G]. Type a ? to define, then type v[V]4 (cr). From the regular editor, type [G]v. Your text will now contain the [V]4. Print this text. The UltraTerm display will immediately change!

A whole document may also be printed to the UltraTerm. This is sometimes useful when you want to see how the document will actually look (margins and page boundaries included) without wasting a lot of paper.

David Gregg
Syracuse, NY

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Circle 43 on Reader Service Card

Attaching a Non-Apple disk drive to the Apple*//c*

People who have an Apple *//c* or are considering getting one probably know that Apple used an atypical connector for the second disk drive. The second drive uses a DB19 connector for the second disk drive. The second drive uses a DB19 connector—try to find that in your local parts store! Anyway, I wanted to add a Rana drive to my *//c* and I couldn't find a DB19 anywhere, so I phoned the Apple technical support number in Boston. I got the pin correspondences between the DB19 (19 pin) connector on the back of the *//c* and the typical 20 pin ribbon cable connector on Apple *//e* type drives. They are as follows:

DB19	20 Pin
1	1
2	3
3	5
4	7
5	9
6	11 & 12
7	13 & 15
8	17 & 19
9	none
10	20
11	2
12	4
13	6
14	8
15	10
16	9
17	14
18	16
19	18
ground	ground

My solution to the lack of DB19 connectors was to buy a Radio Shack RS232C 25 pin male connector, open it, and cut it down to 19 pins. The pins on the RS232C connector are numbered in the plastic of the plug. The DB19 follows the same arrangement for numbering. The 20 pin connector of the disk drive has pin holes number 1, 2, 19, & 20 numbered in the plastic of that plug (which is just enough to see the order the numbering follows there). I hooked up my Rana drive and it works just fine.

Alan Knutson
333 Arbor Way
State College, PA 16803

Visifile to Appleworks Conversion

I'd like to share a method of converting Visifiles to Appleworks with those who have found Visifile so slow as to be almost useless.

Conversion to Appleworks via the DIF requires that entries end with a "carriage return" and that the file be created in the "column-wise" option. The problem is that DIF Visifiles are not read directly by Appleworks and require an intermediary step as follows:

1. **Convert Visifiles to DIF.**
2. **Load the Visifile into a spreadsheet (I used THE Spreadsheet).**
3. **Convert that file to ProDOS.**
4. **Load into Appleworks (Database to Spreadsheet).**
5. **Add category names using open-apple N.**
6. **Presto! The data base file is now in Appleworks.**

This may all be general knowledge, but I couldn't find anyone who knew. Probably because very few use Visifile.

Sincerely,

Rollie Hammer
208 No. Wasson Ln.
River Falls, WI 54022

Feedback

I thought I would drop you a short note to let you know how much I like the format. I found the Vol.7, No.9 to be especially interesting. I really enjoyed the articles by Clay Ruth and Tim Kendrick.

With regard to the telephone answering machine, I would add that if you are afraid of hardware modifications as I am, the Apple-Cat modem by Novation will interface with the Echo speech synthesizer and the phone line without the additional hardware. In fact your household lights and appliances can be controlled with the Apple-Cat's BSR option. It is even possible to call one's computer and by entering a password from the phone pad have the Echo speech synthesizer deliver a particular message to the caller or the caller could activate various BSR modules in the home. The possibilities are unlimited! Needless to say I am very pleased with my Novation Apple-Cat modem.

I do not know what the average age of your readership is, but would you consider making the type for the program listings a little larger? My old eyes thank you.

Best regards,

James C. Harpel

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December 1984

Don Elman

Group Spirit

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Renewal Confusion

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Feedback Pays Off

Sending in the Reader's Choice card serves two purposes. First, we use the information about your magazine preferences as guidelines in choosing future articles. Second, you become eligible for the monthly drawing which has a prize of $100 toward A.P.P.L.E. products. Recent winners include John H. Broderick of South Portland, Maine (September drawing) and Fred Sorenson of Lake Oswego, Oregon (October drawing).

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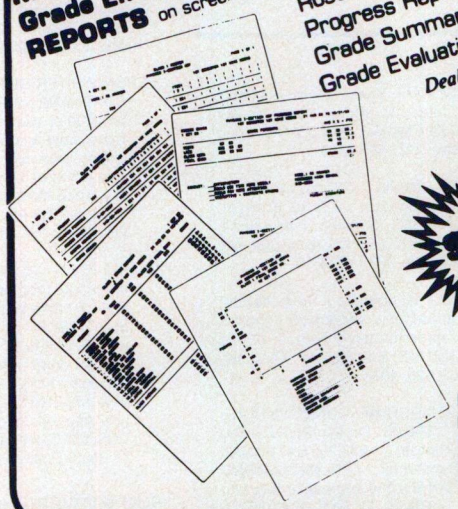

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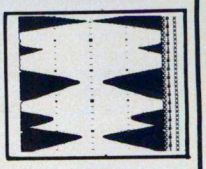

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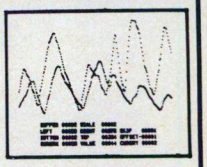

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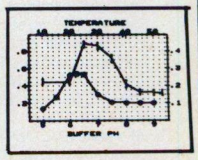

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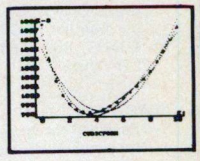

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PERSONAL COMPUTER ADDRESS BOOK—$11.95 designed for Apple II+ owners. Keeps address books for yourself or your business. Generates labels and phone lists. Keeps address ordered by last name. Each program is customized, please supply address book name. E.C. Software Products, P.O.Box 4598, Santa Clara, CA 95054-0598.

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INCREDIBLY LOW PRICES!-300 baud direct-connect MODEM w/software & SOURCE subscription-$99, Disk Drive-$174, Koala Pad-$90, Bank Street Writer-$48, Flight Simulator II-$38. ORDER NOW or write for FREE catalog. We'll save you money on all Apple HARDWARE &SOFTWARE! Zipp Software, P.O. Box 1871, Costa Mesa, CA 92626. CA residents add 6% tax.

VERSA-WRITER GRAPHIC TABLET + EXPANSION PAC II SOFTWARE—For Sale. Package cost $339. and will sell for $100 or best offer. In excellent condition. All offers, reasonable and unreasonable will be considered. Also selling assorted original utility software that I never use—never have—never will... including THE ROUTINE MACHINE, & SCREEN, and THE CREATOR. Write or call: Pax Nidorf, 4757 Sun Valley Rd., Del Mar, CA 92014—call (619) 755-3161.

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RENT SOFTWARE—$5 monthly. No membership fee. Send large SASE to: Preowned Software, 4229 Baker Ave NW, Seattle, WA 98107 for list.

PRICE BUSTERS!-Top-rated software, supplies and hardware at low, low prices. Send for **FREE** price list. See how much YOU can save! Tangent 270, 2509 Dahlia, Box 38587A, Denver, CO 80238, (303) 322-1262.

THE LOG—An accounting/recordkeeping program for property owners. New 1985 edition prints transaction journal, individual/summary reports, Instant cash flow analysis, depreciation, tenant information. Ideal for Tax preparation. Two Drives. Only $129.00 (S & H included). Send check to PRACTICAL SOFTWARE, 4162 Windsor Dr., Huntington Beach, CA 92649 (714) 842-0386. Brochures available.

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EASY CHECKBOOK—Easy Checkbook is an extremely simple-to-use, menu-driven checkbook program for Apple II+ and IIe computers. Features include simplified data entry, user-defined codes for expense items, ability to adjust earlier records, prepare annual report on 50 items, list tax-deductible items, analyze monthly income and expenses and many more. Send $29.95 to: Ram Ravindran, 7731 Traders Cove La, Indianapolis, IN 46254.

EAMON ADVENTURES—Choose from Units 1,2,3 or brand new -4. Each with 18 adventures and utilities on 9 disks for $35. Any 2 units for $60. Any 3 for $85. All 72 exciting adventures for $110. Sample adv. @ $5. Send to: AdventureDisk, Box 216, Mercer Island, WA 98040.

MOUSETRACER—Use your Mac, IIe, or IIc mouse and draw like the pros! Put cartoons, pictures, logos, etc. on the drawing board. Strap your mouse to the Mousetracer and use your favorite graphics program to trace the picture of your choice. The possibilities are limitless! Send $34.95 + $2 S&H (CA res add $2.27 sales tax) to: Brimark Innovations, 9821 Yolanda Ave. Northridge, CA 91324.

FOR THE MACINTOSH—Learn how to program in Microsoft BASIC. The Mac's Core—$69.95. The Professor 1-800-223-5838, 959 NW 53rd St., Ft. Lauderdale, FL 33309.

128K RAM BOARD—Expand your Apple II, II+ or IIe memory by 128K for just $145! Plug-in board can be used in any vacant slot in your Apple. Once installed, the 128K RAM Board can be used as a super-fast pseudo-disk operating under DOS 3.3, CP/M, or Pascal. Or use it as an expansion of the motherboard RAM to store arrays, subroutines, programs etc. Even relocate DOS to free up user memory. Comes complete with 75 page users manual and 3 disks of applications software. Send only $145 for return delivery by registered air-mail. VISA and MasterCard accepted. Further details available on request. Or send Sourcemail to BBV970. COMMUNICATIONS ASSOCIATES, GPO BOX 7779, HONG KONG.

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DON LANCASTER'S AWIIe TOOLKIT—Eight diskette sides crammed full of Applewriter IIe goodies including NULL, shortline, and IIc de-trashing patches, full microjustify and proportional space, complete and thorough disassembly script, sourcecode capturing details, self-prompting glossaries, answers to hundreds of most-asked questions, bunches more. Includes free "must have" bonus book and voice helpline support. Unlocked and unprotected. $39.95 from SYNERGETICS, Box 809-CST, Thatcher, AZ, 85552. VISA/MC. (602) 428-4073.

TERMINAL TRIVIA—Over 1000 questions on three disk system...Choose any two 500^{s} question disks: SUPER POT LUCK, SPACE TREK, MOVIE and TV MARVELS, SPORTS SENSATIONALS, ROCK 'N' ROLL REVIVAL, and MORE!!! Twelve different ways to play with up to five people. TERMINAL TRIVIA Only $39.95 plus P&H. TRIVIA BUFF: Adult party version only $49.95. 30 day money back guarantee. (MC/VISA). Info: (804) 525-3441. For orders, call collect.

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BMBBS BULLETIN BOARD SOFTWARE—$49.95. Suitable for use at home, school or business. Features: Sysop's utilities, extensive documentation, 1/more drives, upper & lower case, clock support, music, free space indicator, downloads, E-mail, free modem hotline and much more! For more information call BMBBS HQ at (201) 992-9893 (modem). To order, enclose name, address & check or money order for $49.95 + $2 S&H. Specify Micromodem, AppleCat w/Firmware or Smartmodem w/Apple Super Serial Card. Bytemaster Software, P.O.Box 366, Livingston, NJ 07039.

COMPUTERIZED RUNNER'S RECORD—Apple II+/e/c, 64K. Fast, easy. Enter data in seconds. Graph, review, record, print daily runs, races. Automatically calculates pace, PR, averages. Complete manual. $29.95 or for information: KNS Software, P.O. Box 9777, Denver, CO, 80209.

FOR SALE—Mountain Hardware Expansion Chassis (new in original carton)—$325. Two printers, like new, DEC Model LA34 (dot matrix) with tractor or friction feed, wide carriage (1″ to 15″), serial port, complete keyboard—$800 each. Frank Salerno, P.O.Box 2601, Weirton, WV 26062.

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WORDSTAR WITH STARCARD by MicroPro. StarCard comes with 64K RAM and Z80B 6mhz plus CP/M 2.2 and WordStar for your Apple. The box has never been opened and the price is only $250 and this includes shipping via UPS. Butch Greathouse 14422 S.E. 132nd, Renton, WA 98056 (206) 271-7139.

ADVENTURE GAMES—Orig disks (no copies) text/graphic Apple adventures (Oo-Topos, Inferno, Mask/Sun, Tarturian, more!), $10-20. Also some strategy, home uses, misc games. BUSINESS—DB Master with Util Pak, $150. The Accountant, $75. Plus good deals on ThinkTank, Data Reporter, DataDex, Visicalc 3.3. Send SASE for price list to: Tod, 3378 Waverly St., Palo Alto, CA 94306 (Private party).

APPLE 9-TRACK TAPE DRIVES—Read / write standard ½″ 800 BPI, IBM compatible 9-track tapes on an Apple. Exchange data with minicomputers and mainframes. Backup floppies and hard disks. Request brochure describing controller, extensive software and available drives. Complete package prices start at $1200. Electrovalue Industrial Inc., Box 376-CA, Morris Plains, NJ 07950, (201) 267-1117.

APPLE-BUILDER KEYBOARDS: Full ASCII. Numeric pad. Caps-lock. Repeat. Self-test! Custom case available. The best Apple-builder keyboard in the USA. Fully described in our flyer. Electrovalue Industrial Inc., Box 376-CA, Morris Plains, NJ 07950, (201) 267-1117.

OVER 2000 SHAPES—Ready-to-use tables on 2 disks. Character sets, game & animation sets, spaceships, animals, flowers, ghosts, beasts, trees, houses, snowflakes, flowchart symbols & more, in various sizes. $29.50 includes instructions, viewing & demo programs. 48K Apple II's. Luster Software (Dept. C4), 541 G street, Salida, CO 81201.

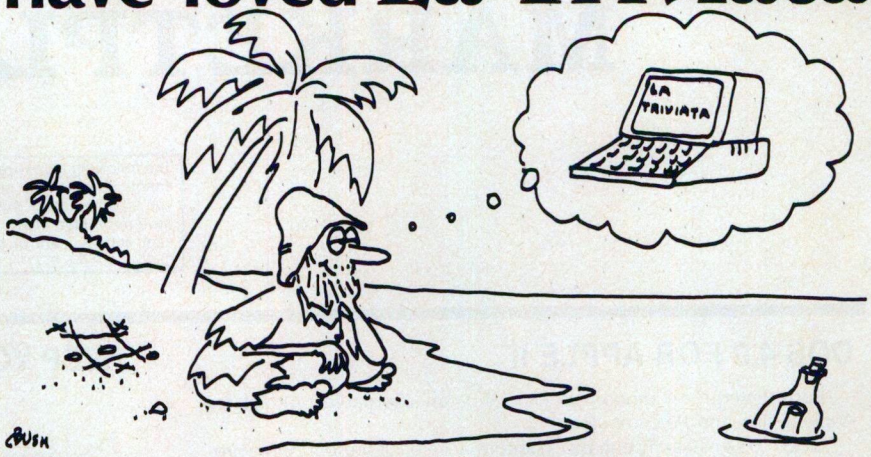
PASCAL USERS—Complete DOS 3.3/Pascal file conversion, both directions, all file types! PLUS a library of procedures allowing full manipulation of DOS 3.3 disks and files from within your Pascal programs! PLUS a sample Applesoft prettyprint utility, written in Pascal! Send $20 to: ROSETTA, 1 Theodore St., Balmain, NSW2041, Australia.

ARMCHAIR CHAT—Fast program that learns a subject from you, then sends you to your reference books as it gets smarter! Spots inconsistencies and corrects itself. Comes with some knowledge of writers. Teach it minerals, scientists, sexual activities...Send $20 to: ARMCHAIR CHAT, 1 Theodore St.,Balmain, NSW2041, Australia.

Next Month

Financial Planning on your computer

Robinson Crusoe would have loved La Triviata



Poor Rob! All alone, with time on his hands and only memories for company. **La Triviata**, the new computerized trivia game, could have filled his empty hours. He could've used his vast knowledge and strategic skills to answer computer-generated questions in seven categories, so he'd never get bored. And if (by chance) anyone had shown up on his lonely island, Rob could have played **La Triviata** with them. Or he could have conjured up three imaginary friends and competed against them.

You may not have Rob's problem. But if you have an Apple II+, IIe, or IIc, you can play **La Triviata** anyway. Alone or with friends.

The exciting new computerized trivia game for adults and teenagers.

- **Game disk and 2 question disks.**
- **Play by yourself, with a friend, or at a party.**
- **Challenge your knowledge and your strategy skills.**
- **Learn while you play.**
- **Capitalize on your best subjects.**
- **Choose your own question difficulty level.**
- **Challenge the computer's scoring.**
- **Record your scores onto disk.**

La Triviata. It'll give you something to do until "Friday" comes along.

Available at software stores or by mail order.

Please send me _____ game(s) (3-disk set) at $34.95 each plus $2 postage and handling. (Minnesota residents also add 6% sales tax.)

☐ Check or money order for $_____ enclosed.

☐ Charge to ☐ MasterCard or ☐ VISA.

Account No. _____ Exp. date:_____

Name: _____

Address: _____

City / State / ZIP: _____

Mail to: Quest Learning Systems, P.O. Box 16282, St. Paul, MN 55116.

Orders charged to MasterCard or VISA will also be taken by phone. Call (612) 887-0492.

GAMES ORDERED BY DEC. 14 WILL ARRIVE BY CHRISTMAS.

Dealer Inquiries Welcome

QUEST LEARNING SYSTEMS, INC.

P.O. Box 16282, St. Paul, MN 55116

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THE MARKETPLACE

The following items are selected by our editorial staff from the large number of product announcements and news releases sent to us daily. They are presented solely to keep you informed about the current market for Apple related hardware and software. As we have not tested many of these products, appearance here does not necessarily represent endorsement or recommendation by A.P.P.L.E. Watch for evaluative reviews in *Call — A.P.P.L.E.*.

DOS 4.0 FOR APPLE II

Rune Enterprises announces DOS 4.0—an affordable product for Apple II, II+, and *//e* computers.

DOS 4.0 significantly enhances performance of all present Apple programs and increases available disk storage space over prior Apple Disk Operating Systems.

DOS 4.0 has the following advantages over Apple DOS 3.3:

1. Processes programs up to 25% faster
2. Provides up to 35% more disk storage
3. Increases the available RAM for language card owners
4. Improves file handling capabilities
5. Increases performance of "house-keeping" routines
6. significantly enhances the programmer's environment
7. Uses the latest in advanced software techniques
8. Includes a new plug-in CMOS 6502 processor
9. Adds 27 new programming codes

The DOS 4.0 package consists of an easily installed CMOS 6502 processor, RUNE DOS 4.0 software, a step-by-step Installation and User Manual, and a Technical Manual. Price: $95. For more information contact: *Rune Enterprises, Sales Department, Suite 214, 80 Eureka Square, Pacifica, CA 94044, (415) 355-4851.*

APPLE COMPUTER ANNOUNCES "TEST DRIVE A MACINTOSH" PROMOTION

Cupertino, CA, November 1, 1984—Apple Computer, Inc. today announced a unique winter promotion that allows customers to borrow a Macintosh personal computer for trial use in the customer's home or office. From now through January 31, 1985, customers can borrow a Macintosh for 24 hours from participating authorized Apple dealers under the "Test Drive a Macintosh" program.

"We've always said that Macintosh is so easy to use that individuals can learn to use the computer overnight," said Mike Murray, director of marketing for Apple Macintosh division. "It takes most people 20 to 40 hours to learn how to use a traditional personal computer," said Murray. "With Macintosh, a user can perform tasks in less than one hour."

Customers must be 18 years of age and have a major credit card and valid identification to participate. If customers decide to purchase a Macintosh after having a "test drive," they will already be approved for a $3000 credit line under the Apple Instant Credit Card plan, with initial payments not due until February.

Customers participating in the "Test Drive a Macintosh" promotion will receive a Macintosh 128K personal computer, carrying case, and a special "Test Drive a Macintosh" manual, business software, and audio training cassette. The Test Drive software enables the customer to use five leading business productivity programs, including MacWrite (word processing), MacProject (project management), and MacPaint (graphics) from Apple Computer, and Multiplan (spreadsheet) and Chart (business Graphics) from Microsoft Corporation. The 16-page manual, prepared especially for the promotion, is used with the software to introduce the customer to the major features of Macintosh.

KEEP YOUR MOUSE ON A ROLL

Mouse MATe-2 is a desktop working mat for the Apple mouse. Manufactured from sealcoated high-density polyfoam in a large 10 x 12 inch size, it allows unrestricted use of the mouse on any surface without dragging, scraping, or wear on the mouse bottom. Mouse MATe-2 insures smooth line drawings, and has as open foam-cell underside to prevent sliding on smooth surfaces. List price: $9.95 PPD from *The Mouse MATe Company, Post Office Box 623, Derby, Kansas 67037, (317) 777-4926.*

PURSUING TRIVIA—COMPUTER STYLE

The release of *La Triviata*, a computerized trivia and strategy game for the Apple II+, *//e*, and *//c*, has been announced by Quest Learning Systems, Inc., a software development company in St. Paul, Minn.

La Triviata features questions of varying difficulty levels and a point-based game board that requires players to use both trivia knowledge and strategy skills. One to four players or teams can play at one time. And one person can "invent" one to three other players and play against these fictional characters.

The game randomly selects questions from seven categories. Players choose questions from one of three difficulty levels, decide in which game board slot the points should go, and type in the answers. The computer judges their accuracy.

The game's sophisticated answer judging allows for typographical errors and more than one right answer. However, if a correct answer is judged wrong, the game's challenge feature allows players to challenge that judgment.

The *La Triviata* package consists of one game disk and two question disks. Additional question disks are being developed.

The game currently is available through mail order by sending a check, money order, or MC/Visa account number to *Quest Learning Systems, P.O. Box 16282, St. Paul, MN, 55116.* For MC/Visa charges, one can order by calling *(612) 887-0492.*

Total cost is $34.95 per game (game disk and two question disks) plus $2.00 P&H per order. Minnesota residents also must add 6% sales tax ($2.10 per game).

CODE	PRODUCT	PRICE	LBS.	OZ.
SSARGN	SARGON III	$ 39.00	0	14
STHITK	THINK TANK	$119.00	1	0
PBAPRD	BENEATH APPLE ProDOS	$ 18.00	1	0
PINS2E	INSIDE THE APPLE *//e*	$ 18.00	2	0
SINS2E	INSIDE THE APPLE *//e* DISK	$ 18.00	0	2
SLATRI	LA TRIVIATA	$ 27.50	0	6
SPATH	PATH TACTICS	$ 27.50	0	13
SFRCOM	THE FRIENDLY COMPUTER	$ 27.50	0	13
HLISVR	LIS'NER 1000 PHONETIC speech synthesis upgrade	$ 75.00	1	0
SMODMA	MODEM MAGICIAN	$ 30.00	1	0
HGEN10	2 BOXES OF 10 5¼"	$ 25.00	1	0
HEPROM	AP-BURNER EPROM Programmer	$ 75.00	1	0
SAPE	APPLESOFT PROGRAM EDITOR	$ 30.00	0	4

ORDERING CHECKLIST

To speed all orders, please include:

1. Your Name as it appears in our records (same as on your mailing label)
2. Member number and expiration date
3. Complete STREET ADDRESS (**not** Box number — see explanation below)
4. Phone number to reach you by day if we have questions
5. Payment Including:
   Handling charge if applicable
   Domestic or Foreign Shipping Charges

   (Sorry, we do not accept COD or Purchase Orders on individual memberships)

Each item you order needs:

6. Complete product name (and version if there is more than one product of that type)
7. Product Code

SHIPPING ADDRESS: We normally ship products by United Parcel Service (UPS). Therefore, the shipping address on your order cannot be a post office box. You may specify a P.O. Box for orders weighing less than 8 ounces. You also may make special arrangements for shipping some items via US Mail, Air Parcel Post, or UPS Second Day Air.

DOMESTIC SHIPPING CHARGES

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Up to 5 Lbs.	$ 2.00
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10 - 15 Lbs.	4.00
15 - 20 Lbs.	5.00
20 - 25 Lbs.	6.00
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35 - 40 Lbs.	9.00
40 - 45 Lbs.	10.00
45 - 50 Lbs.	11.00

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2.					
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5.					
6.					

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4 - 8 oz.	1.80	2.60	3.40
8 - 12 oz.	2.32	3.53	4.72
12-16 oz.	2.84	4.44	6.04
16-20 oz.	3.36	5.36	7.36
20-24 oz.	3.88	6.28	8.68
24-32 oz.	4.92	8.12	11.32
2 - 3 lb.	7.00	11.80	16.60
3 - 4 lb.	9.08	15.48	21.88
Each additional ½ lb. over 4 pounds add:	1.04	1.84	2.64

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0-4 oz.	$ .71
4-8 oz.	1.39
8-12 oz.	2.07
12-16 oz.	2.58
2 lb.	3.10
3 lb.	4.10
4 lb.	5.10

For weights over 4 lbs: $5.10 + $1.00 additional per pound.

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WEIGHT NOT TO EXCEED	48 STATES A	HAWAII D
1 lb.	$3.00	$4.53
2 "	4.00	5.71
3 "	5.00	6.89
4 "	6.00	8.07
5 "	6.50	9.25
6 "	7.50	10.43
7 "	8.50	11.61
8 "	9.50	12.79
9 "	10.50	13.97
10 "	11.50	15.15
11 "	12.50	16.33
12 "	13.50	17.51
13 "	14.50	18.69
14 "	15.50	19.87
15 "	16.50	21.05
16 "	17.50	22.23
17 "	18.50	23.41
18 "	19.50	24.59
19 "	20.00	25.77
20 "	21.00	26.95
21 "	22.00	28.13
22 "	23.00	29.31
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SPEECH SYNTHESIZER FOR THE APPLE II

Artic Technologies announces the release of SynPhonix, an Apple II, II+, *IIe* compatible speech synthesis board featuring the new SSI263 phoneme synthesizer.

SynPhonix 100 plugs directly into Apple II (*IIe*) slots 1–7. There is an on–board audio amplifier, volume control, and external speaker jack. An optional on–board speaker is also available. There is a socket on the board for a second voice, to be available in the future, allowing two part singing.

Accompanying the SynPhonix 100 is SONIX–65, an easy–to–use speech operating system on diskette, which sets SynPhonix apart from other speech synthesizers. Running under DOS 3.3, SONIX–65 uses very little memory and is transparent to the user's software. It handles all complicated software interface tasks, such as interrupt servicing.

In addition to SONIX–65, SynPhonix includes pre–programmed vocabulary, demonstration software, a Spelling Tutor program, and a comprehensive user manual in a notebook with a slipcase. Users can generate speech and sound effects, and incorporate them into their software with standard BASIC statements.

SynPhonix 100 retails for $125. SynPhonix 100 , which includes an on–board speaker, retails for $135. For additonal information, contact: *Artic Technologies, 2234 Star Court, Auburn Heights, Michigan 48057 (313) 852–8344.*

COMMUNICATION SYSTEM FOR THE MACINTOSH

Novation, Inc. has introduced a new Cat Communication System for Macintosh using Hayes protocol.

The new system features an advanced stand–alone 300/1200 Smart–Cat PLUS modem packaged with menu–driven MITE software. The modem is based on LSI technology. Also included in the system is a complete, operating manual covering both the hardware and software.

Features in the new modem include dial tone detect, essential for accurate use of long distance services such as MCI and Sprint. The modem can also detect a busy signal, then dial an alternate number without waiting. Also, there is automatic selection of TouchTone or pulse.

Suggested retail price is $499 for the full system, including cable, adaptor, software, manual, and modem. For complete information contact *Novation, Inc., 20409 Prairie Street, Chatsworth, CA 91311 (800) 423–5419 (outside of California) or (818) 996–5060 (within California).*

MACINTOSH DEVELOPMENT SOFTWARE

San Diego, CA — SofTech Microsystems announces a full software development environment for the 128K Macintosh microcomputer.

The software packages offered include:

- UCSD Pascal Development System ($195)—allows access to mouse, graphics and text fonts provided by Mac ROM routines.
- FORTRAN–77 Development System ($295)—provides the user with an ANSI–77 subset FORTRAN with support for structured programming and improved character types.
- Advanced Development Tool Kit ($150)—augments the software development environment provided with UCSD Pascal and/or FORTRAN–77. The tool kit includes source code for graphics/mouse interface, a symbolic debugger, 68000 Assembler, and a linker. The advanced developmental tool kit allows the developer to analyze and optimize programs during development.

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There's the half-height 10-megabyte Winchester drive, for a start, with field-proven reliability, expansion capability, and offering direct boot from the hard disk. There's the best-selling intelligent controller in the business, with automatic data error detection and correction, internal diagnostics, optimal transfer rate between host and disk, and greater and faster system throughput with less software overhead. There's the steady power supply for day-in, day-out trustworthiness. And all components have been matched, tested and tested again, and designed into a "bookend" casing that doesn't even need a cooling fan.

Want to talk more tech? We could tell you about menu-driven installation, backup and restore utilities, flexible partitioning, FCC Class B approval, a wide range of operating system support and lots more. Suffice it to say that The Sider is a first class engineering achievement as well as a handsome, hard-working sidekick for whatever you and your computer need doing.

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Our name is our commitment. We're offering a first class, one-year warranty on The Sider. No hassle. Full documentation. A toll-free hotline to answer any technical or service question you may have. Best of all, if there's any problem—repeat, any—that relates to the manufactured quality of The Sider, send it back and we'll replace it. Fast.

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The Sider is going to sell like crazy. It's the right product. And—take a look at the first paragraph again—at the right price. No one else is going to make an offer like this for a long time to come.

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**** TITLES AND COMMENTS with your printout
**** KOALA SCREEN (normal or magnified)

*** PRINT WHILE USING DOS OR BASIC COMMANDS
*** CHANGE PRINTER SET UP WHILE ANOTHER PROGRAM IS RUNNING

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  EPSON/GEMINI or compatible or OKIDATA 92/93
- For all SSD features except low res graphics:
  Graphics printer interface (like GRAPPLER)
  with any printer supported by that interface
- For all of SSD text features (no graphics):
  Any printer with any printer interface
- Use with any unprotected DOS 3.3 software
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THREE DIMENSIONAL MACINTOSH SOFTWARE

Dimensional Disks has several software products available for the Macintosh.

Mac Sampler is a collection of high quality public domain programs that have been rewritten and enhanced especially for the Macintosh. The programs include Arthropod Classification, Biorhythm, Borders, Calendar, Constellations, Cryptogram, Life Expectancy Test, Time Between Dates, and Two Shapes. The introductory price for Mac Sampler is $12.00.

Dimensional Filer is a file program for the Macintosh that enables you to organize and keep track of information easily. Input and retrieval is easy because the program makes extrensive use of the mouse. Along with Add, Edit, Browse, and Find functions, the program includes a Search function that enables you to find records that meet special criteria. For example, you could search in your Magazine file for all the National Geographic articles about volcanoes. Dimensional Filer is $19.95.

Mac Business I contains three programs for the small office—General Ledger, Balance Sheet, and Profit & Loss. All three programs provide monthly and/or year-to-date reports. Mac Business II consists of two programs for the small business—Billing and Inventory. Input and reporting is easy in all five programs, through extensiv euse of the mouse. Mac Business I and Mac Business II cost $19.95 each.

All programs require Microsoft BASIC. For more information or to order, contact: *Dimensional Disks, P.O. Box 1180, Blaine, WA 98230 (604) 584-2601.*

MAC TECH JOURNAL

The *Mac Tech Journal* is a bi-monthly journal devoted to Mac and Lisa users and 4th-party product developers. Original articles include the following:

1. Editorials and comments.
2. In depth product reviews including 4th-party as well as 3rd-party products.
3. General articles providing helpful tips and techniques.
4. Programming articles in significant languages as they become available.
5. The MICROINDEX bi-monthly index to Mac and Lisa articles, editorials, notes, reviews, and product announcements as contained in a significant number of Microcomputing journals.

The *Mac Tech Journal* is available immediately and sells by six-issue subscriptions at $39.00 for U.S. and $59.00 for non-U.S. *Serious Personal Computing, P.O.Box 7059, South Nashua, NH 03060 (603) 888-1376.*

MOUSEPRINT ALLOWS APPLE'S MOUSEPAINT TO PRINT DIRECTLY

Danville, CA — AHWARE announced today the release of its MOUSEPRINT program which allows Apple's MousePaint program to print directly on printers other than Apple's Dot Matrix or Imagewriter.

Currently, users of the MousePaint software who do not have Apple printers and interfaces are not able to print directly as the program was intended. They must save the picture they have created, convert it from Apple's new ProDOS to the more widely used DOS 3.3, and then use some other graphics printing routine to see a hard copy of their drawing.

MOUSEPRINT is a simple menu driven program which modifies a back up copy of MousePaint to print directly with the program's built in "print picture" function.

Versions of MOUSEPRINT are available for most popular printer/interface combinations. Printers currently supported include the Epson, Okidata, C.Itoh and Star Micronics lines. Interfaces currently supported include Epson, Grappler, Pkaso, Prometheus, Microbuffer, Graphicard, Apple and Printerface.

MOUSEPRINT is priced at $22.95 and is available via direct order from AHWARE, 805 Luz Court, Danville CA 94526. Purchasers should specify their printer/interface configuration when ordering.

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STAR SPRITE

Announcing a revolution in Apple graphics and sound! The STARSPRITE™ software system from Avant-Garde's Don Fudge, paired with the Sprite & Stereo Board™ from Development Devices. Together, the most dynamic and versatile innovation since the Apple computer itself. Imagine sprite graphics on *your* Apple: flicker-free animation, 16 hi-res colors, 34 video planes, stereo sound. With multiplane graphics and two separate programmable sound generators, the creative possibilities are limitless!

STARSPRITE I gives you easy access to the abilities of the Sprite & Stereo Board in animation, color, and sound. It includes games, tutorials, and sprite utilities, and introduces the Ampersprite™ language. A special "Try Out" section lets you get started immediately. Non-programmers and programmers (Applesoft) alike will have months/years of fun with this system. STARSPRITE II lets you experience *all* the creativity and fun possible with sprite graphics and the Apple computer: fast and smooth animation, multiple-tone music, games, drawing and color-fill routines, pattern editing, programming tutorials — and much more! And you can transpose all your present Apple graphics shapes and screens into VDP graphics! STARSPRITE III gives more experienced graphics programmers detailed information on assembly programming and machine language for the Sprite & Stereo Board, and it contains all the source codes for the entire STARSPRITE SYSTEM. Each STARSPRITE package includes a manual (from 100+ to 300+ pages) in a 3-ring binder album with software enclosed.

The most extraordinary graphics system available to date: STARSPRITE software with the Sprite & Stereo Board.

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StarSprite I: special $69.95 (reg. $79.95)
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StarSprite III: special $69.95 (reg. $79.95)
Sprite & Stereo Board (16K): special $239 (reg. $249)
Sprite & Stereo Board (64K): special $289 (reg. $299)
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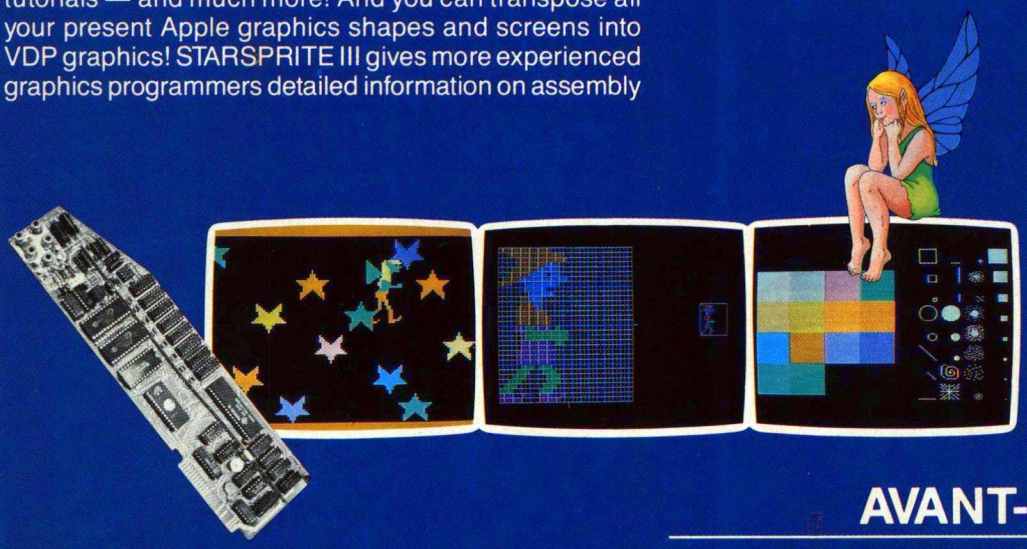

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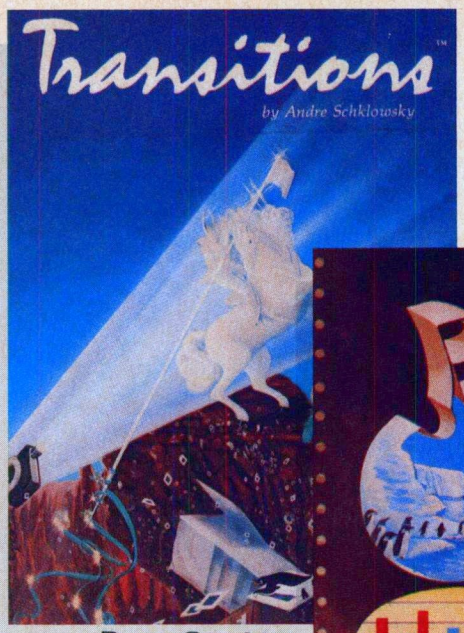

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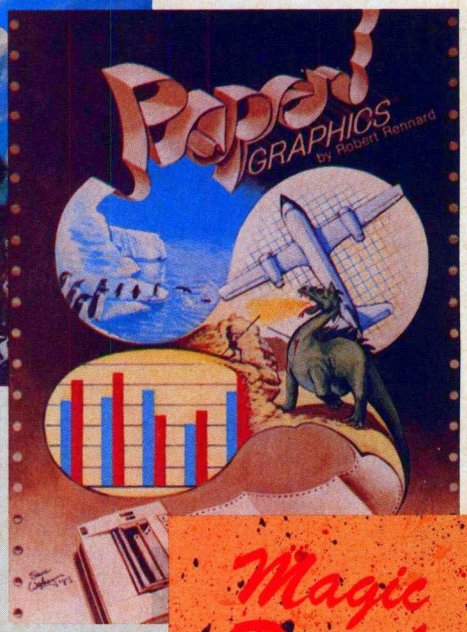

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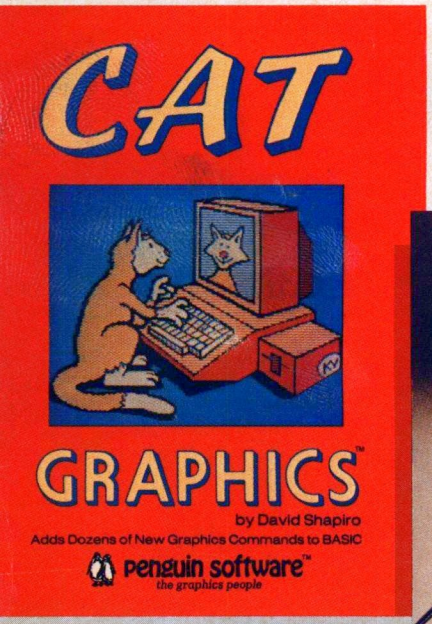
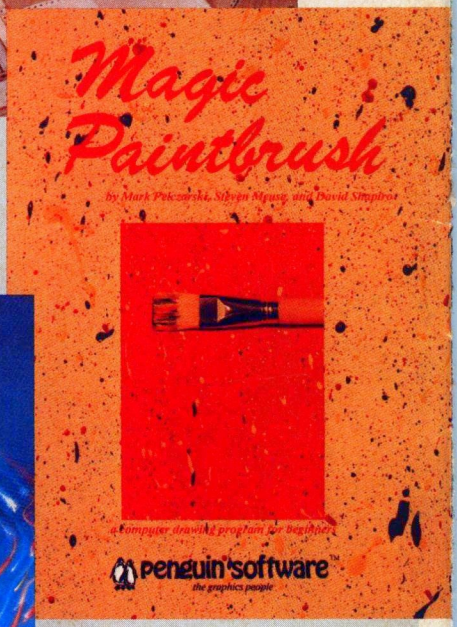
Print screen images on virtually any printer, using almost any interface card. Advanced cropping, annotating, and magnify features.



Cat Graphics
For the programmer. Adds 55 new graphics and sound commands to BASIC, such as Circle, Fill, Magnify, and others.



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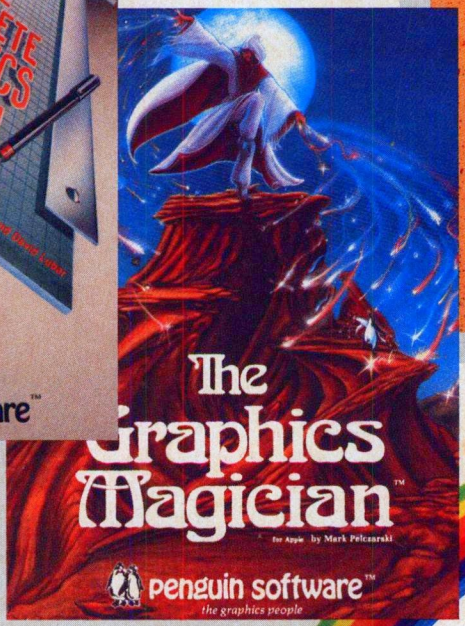

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